

JPRS 80400

25 March 1982

USSR Report

CONSTRUCTION AND EQUIPMENT

No. 58

FBIS

FOREIGN BROADCAST INFORMATION SERVICE

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CONSTRUCTION

NOVIKOV COMMENTS ON BUILDERS' DAY

Moscow PRAVDA in Russian 9 Aug 81 p 1

[Article by USSR Gosstroy Chairman I. T. Novikov: "One of the Largest"]

[Text] Today, the country honors construction workers, people in one of the largest occupations on earth. Their hands have made all the bright floors of the cities and settlements, the factory and plant buildings, the railroad lines. USSR Gosstroy Chairman and USSR Council of Ministers Deputy Chairman I. T. Novikov told our PRAVDA correspondent about the labor successes with which construction workers are greeting their holiday and what tasks they are faced with resolving in the 11th Five-Year Plan.

"Construction industry is, I guess, one of the largest branches of the national economy. Its impact on economic development and growth in the well-being of the people is enormous. Just during the first six months of the first year of the five-year plan, fixed assets worth about 31 billion rubles were put into operation. New power units and capabilities to produce pig iron, steel, rolled metal, automobiles and to extract petroleum and gas have begun operating. The Soviet people have received 540,000 apartments with all amenities.

Construction collectives are working along the most important lines and participating in implementing very complex comprehensive programs. They are mastering the wide spaces of Siberia and the Far East, transforming the face of the Nonchernozem zone, putting up electric power plants and laying the Baykal-Amur Mainline.

As Comrade L. I. Brezhnev stated at the 26th CPSU Congress, the 11th Five-Year Plan will be a serious test for construction workers. They are faced with qualitatively improving branch operation, improving the effectiveness of capital investments and reducing unfinished production to the norms. In order to do this, the bulk of the funds and material-technical resources are being directed into renovating existing enterprises and finishing projects already begun. This is reflected in the plans, the heart of which is the start-up program.

Introducing the new management mechanism has a beneficial effect on improving construction production and on putting capacities into operation promptly. Contractor collectives are being changed over to calculations with clients for commodity output, for fully completed projects. Material incentives funds will now depend on this. We are beginning to use the method of supplying construction sites through territorial

Gosnab agencies on the basis of collectives' orders in strict accord with the demand as stated in plans and estimates. A search is underway for an optimum system of branch management. The basic links will be the construction-installation associations. Their work will be evaluated on the basis of planned indicators such as putting capacities and projects into operation, labor productivity growth and profit growth. The responsibility of clients, planners and suppliers of materials and equipment for end results is being increased. The experience of collectives in Belorussia and Lithuania, where this management system has been experimentally tested, testifies to its great effectiveness.

This is, so to speak, the main line of our work. But it must not be forgotten that each collective has quite a few reserves whose use can significantly improve things. One usually keeps quiet about shortcomings on holidays, but I will not. In many construction organizations, we have still not done away with idle time, inefficient use of equipment and materials. There are high losses of cement, metal and wood. Strictest economy of use of the national wealth is yet to become the basis of management. Some projects are released after great delay, incomplete and poorly built. Brigade cost accounting is being introduced slowly.

I should like to focus particular attention on carrying out the social program. In fact, everything we do is aimed at raising the standard of living. This year alone, we are faced with putting up 108.9 million square meters of housing and apartment layouts will by and large be improved. We plan to build or renovate hundreds of enterprises and shops producing consumer goods and many cultural, personal-services and public health facilities.

The party has outlined a large construction program for the 11th Five-Year Plan. In order to carry it out successfully, we need to concentrate our efforts and resources on start-up projects, accelerate scientific and technical progress in the branch and improve labor quality in all production links. And construction workers are in fact applying all their skill, knowledge and experience to increase new cities and settlements, plants and factories, faster so that our country will become even mightier and more beautiful.

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UZBEK SSR: CONSTRUCTION FIGURES THROUGH AUGUST 1981

Tashkent PRAVDA VOSTOKA in Russian 11 Sep 81 p 3

[Text] The collectives of republic construction and installation organizations are persistently laboring to actualize the historic resolutions of the 26th CPSU Congress.

During the first eight months of this year, they utilized eight percent more capital investment and did eight percent more construction-installation work than during the corresponding period last year, putting 1,432,000 m² of housing, schools with places for 65,154, children's preschool institutions with places for 13,870, some 1,305 hospital beds, polyclinics to handle 2,450 visits into operation and mastering about 38,000 ha of new irrigated land.

The work of the republic's main contractor ministries and departments during January-August of this year is described by the following indicators (in percent):

	(1)	(2)	(3)	(4)
Ministry of Construction	65	104	100.5	105
Ministry of Rural Construction	66	105	102	112
Ministry of Installation and Special Construction Work	159	105	107	105
Glavtashkentstroy	75	100.2	100.1	103
Ministry of Land Reclamation and Water Resources (Minvodkhoz)	95	106	110	112
State Committee for Water Resources Construction (Goskomvodstroy)	89	104	109	106
Ministry of Highway Construction and Maintenance (Minavtodor)	81	111	111	111
Glavsredazirsovkhozstroy (UzSSR portion)	84	97	105	106
"Uzkolkhozstroy"	75	106	107	104

Key:

1. Commodity construction output marketed
2. Performance of calculated construction-installation work during August
3. During January-August
4. January-August 1981 as a percentage of January-August 1980.

All the main republic contractor ministries and departments carried out the plan for the first eight months in terms of calculated volume of construction-installation work. However, as is evident from the indicators given, several ministries failed to carry

out the plan in terms of finished commodity construction output marketed and the Glav-sredazirsovkhozstroy failed to carry out the calculated construction-installation work plan in August. The delay in building housing, schools and children's preschool institutions is causing serious alarm and concern.

The rates of putting fixed assets into operation are low for many branch ministries. In a number of oblasts, cities and rayons, there are delays in building projects for light and food industry intended to produce consumer goods.

Delay has been permitted in building branches of the Andizhan Cotton Combine in Mar-khamat and Chualm, a branch of the Bukhara Karakul Plant, a baked goods combine and refrigerator plant in Dzhizak, an "avrovyy" fabrics combine in Namangan and several other plants.

In September, we are faced with carrying out a large program of putting into operation fixed assets, production capacities, housing, cultural and personal-services projects. To do this, we will require a maximum concentration of material-technical and human resources at start-up projects, proper organization of the labor of builders and installers, and the creation of every condition for them to meet the high socialist obligations they have assumed.

Now, as never before, we require accuracy and efficiency in the work of client organizations. They must immediately engage builders in start-up work, efficiently resolving problems of the prompt and comprehensive delivery of needed equipment and special materials for each project.

Particular attention should be paid to training operating personnel, to enlisting them in inspecting, installing and adjusting equipment at plants and complexes being put into operation.

Oblast, city and rayon party committees and their construction staffs should review at their meetings work results at start-up projects for each 10-day period and, when necessary, daily, taking effective steps to eliminate delay in meeting established assignments and schedules and increasing the responsibility of communists and all construction participants for ensuring unconditional release of all start-up projects of the third quarter for operation.

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CSO: 1821/056

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RSFSR START-UP RESULTS FOR FIRST NINE MONTHS OF 1981

Moscow SOVETSKAYA ROSSIYA in Russian 23 Oct 81 p 1

[Article: "Putting Start-Up Projects Into Operation!"]

[Text] The new five-year plan, as was noted at the 26th CPSU Congress, will be a serious test for builders. One characteristic feature is the concentration of forces in every way possible on the fastest possible completion and start-up of those enterprises capable of ensuring the greatest increment in output and loosening bottlenecks.

"We have already adopted this policy, and it must be followed unswervingly," said Comrade L. I. Brezhnev at the party congress.

Among the most important start-up construction sites of the first year of the five-year plan are the new power capacities, large metallurgical production facilities, processing and machinebuilding complexes, and enterprises and shops to produce food and manufactured goods. Many of the main national economic projects have joined those already in operation. Among them are Leningrad Nuclear Power Plant, the second line of the Kansk heavy-duty vehicle and diesel motor production complex. The network of gas pipeline mains has been expanded. Factories and plants in the Urals and in Ivanovskaya Oblast are being renovated successfully. All this indicates that the client ministries and contractor departments are making definite efforts to restructure their work in using capital investments.

At the same time, the results of the first months of this year show that the rates of restructuring are clearly inadequate. The current start-up program for the Russian Federation as a whole is being carried out unsatisfactorily. During the first nine months of this year, we had to put 360 different production projects into operation. This task was carried out by barely 30 percent. The situation is especially alarming at construction sites in textile and light industry. Completion of capacities at Gorodishchenskiy finishing factory and Dmitrovskiy thin-cloth factory is in danger of not being accomplished. Retooling Berezovskiy woven rug factory and Kolobovskiy weaving factory has been delayed. Readiness of new shops at Zavolzhskiy knitwear factory, Shakhtinskiy cotton combine and the thin-cloth combine in Ulan-Ude to begin operation is poor. Schedules for completing work on the flax plants in Vologodskaya, Novgorodskaya and Pskovskaya oblasts have again been moved back....

What is happening? Based on the resolutions of the 26th CPSU Congress on outstripping development of branches associated with meeting the demand for goods, state

planning agencies have allocated the RSFSR Ministry of Textile Industry significant monetary means and material-technical resources and have enlisted sizable numbers of contractor departments in this work. However, the development of capacities and growth in branch fixed production assets is proceeding extremely unsatisfactorily and, in the end, the population is not receiving the planned amounts of fabrics and garments. It would seem such a situation would have to cause serious concern among branch leaders and arouse them to resolute action. But this is imperceptible in the official explanation signed by minister A. M. Paramonov. Verifying the unsatisfactory construction-installation work plan fulfillment, the minister reports that, "with a view towards improving the situation, the chairmen of state acceptance commissions and ministry officials have been sent to start-up and on-stream construction sites to quickly eliminate the causes of construction delays." Of course, "quick elimination" is a necessary matter. But isn't it a bit late for the Ministry of Textile Industry to suddenly be thinking of this? Will the ministry plenipotentiaries be able to eliminate in a matter of weeks, by sheer will, causes which have accumulated over months and years? This obviously should have been done before now.

The following example is indicative of the problem. In July-August, union contractor ministries analyzed the status of Nonchernozem Zone construction sites. The ministry collegia, jointly with the clients and with the participation of local soviet organs, then adopted concrete resolutions. The rates of construction-installation work in the region quickened appreciably. Many construction sites achieved breakthroughs. Had the partner ministries taken this serious approach from the start of the year, the Nonchernozem start-up program could be significantly more ready today. Let us focus attention on the fact that the improvement occurred by improving management, by deploying worker brigades more efficiently, by concentrating machines and machinery and material resources on the pivotal sectors. Such restructuring is particularly important now, when the fate of the start-up program is being decided, and consequently, so is that of future production plans.

One of the primary demands of the day is comprehensive combining of production, social and personal-services construction. The socialist obligations of workers of the Russian Federation for 1981 anticipate releasing 63 million square meters of housing, new general-educational schools with places for 381,400 pupils, preschool institutions with places for 197,300 children, 27,500 hospital beds and other cultural and personal services buildings. This section of the start-up program is being carried out somewhat better than last year. Still, the bulk of the house-warmings have been put off to the last months. In October-December, we will be faced with completing upwards of half the housing, more than 70 percent of the kindergartens and day nurseries, hospitals and vocational-technical schools. Nonproduction sphere projects are generally being put up along with new shops and enterprises. Houses, stores, dining halls, kindergartens and libraries are often excluded from start-up complexes when work is on an all-hands basis. This practice has been resolutely condemned by the 26th CPSU Congress. Reports on the release of new industrial capacities are considered accepted only if the outlined housing, cultural and personal-services construction program planned for the project has also been carried out. The ministry collegia, local party and soviet organs and the apparatuses of the USSR Stroybank, Gosstroy and RSFSR Central Statistical Administration are called upon to strictly monitor unswerving observance of this principle.

The main cause of failure to ensure the smooth start-up of projects remains the devotion of a number of ministries to old methods of management and the scattering of

capital investments. The state of affairs in rural construction is a typical example. The RSFSR Ministry of Rural Construction carried out the contractor work plan by 94 percent for the first nine months of the year, but met the commodity construction output plan by only 59 percent. Minister N. S. Mal'tsev confidently declares that the annual contractor construction-installation work volume assignment "will unquestionably be completed successfully." But is there much benefit from such "success" if farmers and stockraisers do not receive from rural builders dozens of mineral fertilizer and seed storage facilities and many facilities for cattle, hogs, sheep, goats and poultry? The responsibility for this lies both with the contractor and with the main client itself, the RSFSR Ministry of Agriculture. It was with its consent that 1,300 unplanned projects are being built on republic sovkhozes, and a large number of construction projects have been included in the plan without complete estimate-planning documentation. Upwards of 70 million rubles has now been released "for utilization," but not for specific, finished construction output. The partner ministry collegia would be correct in attentively analyzing their interrelationships and taking immediate steps to regroup their forces and means in order to augment the number of completed construction projects.

The brigade contract is an important start-up period reserve. Thus far, only about 40 percent of the construction-installation work is being done using it. And cost-accounting brigades are often entrusted only with stages and individual types of work. Thus, only 15 percent of the projects being put up under contract in 33 RSFSR Ministry of Housing and Civil Construction organizations checked were being built on a "turnkey" basis. Many start-up projects now have a high level of readiness. In order to accelerate their start-up, it would be appropriate to complement start-up brigades by enlisting the help of future operators. Experience has shown that such multipurpose collectives working on cost-accounting contractual principles are capable of doubling and tripling rates. Greater use should be made of such practical labor organization.

Working commissions to accept buildings and equipment are already operating at many start-up projects. State acceptance commissions are being formed. Their activity is now regulated by a new and stricter statute. It is the task of the commissions not simply to accept structures and installed equipment from the builders, but also, and primarily, to get new capacities into operation more quickly to produce needed output. The new procedure for putting capacities into actual operation forbids reviewing start-up complexes and starting them up under temporary technological conditions, and especially serious attention is being paid to the quality of finished projects. Start-up is not for reporting and book-keeping, but for carrying out production plans, the basic principle of interrelationships among builders and operators.

Ever more assigned brigades are being concentrated at start-up projects. Construction site leaders and party and trade-union committees are called upon to concern themselves with their placement and with providing personal services. Work goes on practically around the clock. This means the public catering system and transport to deliver people to their jobs must also work around the clock. Then organization and conditions for effective, taut socialist competition are better. Such competition must be supported by precise material-technical supply.

The preparations for the 64th anniversary of October elicited a new labor upsurge in construction and installation collectives. They are fully resolved to respond with deeds to the CPSU Central Committee call: "Builders and installers! Increase capital investment effectiveness! Build quickly, well and on a modern technical basis!"

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CSO: 1821/057

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CONSTRUCTION MANAGEMENT REFORMS STILL NOT FULLY EFFECTIVE IN LITHUANIA

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 81 p 9

[Article by M. Makhlin (Panevezhis, Lithuanian SSR): "The Pluses and Minuses"]

[Text] Experiment has become practice. It is from this vantage that Panevezhis's builders are approaching realization of the new management methods.

"Our builders have studied the new management methods in detail in the economic education system," said A. Yatskyavichus, party committee secretary of the Panevezhis Construction Trust. "The collective, along with other Lithuanian Minstroy [Ministry of Construction] organizations, began to use experimentally many elements of the procedure now adopted back at the start of the 10th Five-Year Plan."

You will be convinced by your own eyes of the urgent necessity for adopting the highest level of economic-incentive planning and of all economic activity in construction by the example of this trust, which is average in size. The mechanization and industrialization of construction work have reached a high level here. Improvement in organization of the construction process has been a decisive factor in raising labor productivity and in accelerating the introduction of facilities. The arsenal of funds, experience and high skill levels of construction workers that had been built up was in need of strengthening by modern economic interrelationships. It is precisely a procedure which considers the growing technical level of construction work and is aimed at orienting all construction participants to achieving a single final result--the turnover for operation of facilities that are completely ready to produce output or to extend a service--that is being put into operation during the 11th Five-Year Plan.

The First Results

From now on builders will know their five-year programs with precision, with a breakdown by year. This will open up additional opportunities for comprehensive preparation for production operations and for a strengthening of the in-house industrial base, and, the main thing, it will provide for realism in carrying out the most strenuous tasks.

The builders also welcome the new date for presenting design and budget-estimating papers--1 July instead of 1 September of the year preceding the one being planned. I. Sermontis, chief of the trust's budget-estimating and contract section, acquainted us with the following data.

During the 1980 program the trust did not get the documentation for 4.6 million rubles' worth of construction by 1 September 1979. Even by 1 January 1980 it still had not been provided documentation for 940,000 rubles' worth. Using its acquired rights, the trust excluded from its plan those facilities for which designs and budget estimates had not arrived.

This disciplined the clients and the designers. On 1 July 1980 documentation for the next year's program was short about 2.6 million rubles' worth. By the start of the current year, the trust had been completely provided with the papers.

And how are things going right now? Documentation for about 1.8 million rubles' worth of work--1.3 million of which was in the coordination stage--was overdue on 1 July.

"This trend heartens us," remarks G. Zubas, manager of the trust. "Now it is clear to everyone that the designers have many reserves. It turns out that the documentation can be issued in the full amount in shorter times. There are still those who are in arrears, but many fewer, and the causes of the delay for most of them are valid. We cannot help but take this factor into account. The party's and government's decisions about improving the economic mechanism has enabled us to act with greater adherence to principle and with more exactingness toward formulating the plan and toward providing it with stability. For the first time, for example, we received a draft of the control figures for the five-year plan, and we made our recommendations. We are narrowing down the number of facilities being erected simultaneously. A couple of days ago the chairman of one of the rayon ispolkoms called and insisted on including the erection of a Palace of Culture in the plan. He was decisively refused. A five-year plan is a five-year plan."

At Panevezhis the facilities are not being divided into the important and the secondary. Everything that was included in the plan is first priority and, therefore, must be carried out. During the 10th Five-Year Plan, for example, the trust introduced all the planned facilities--whether industrial capacity or housing, or schools, hospitals, kindergartens or nurseries, and the work quality invariably received a high appraisal.

As is known, when construction time is cut the interest rate for the use of bank credit is reduced. Moreover, the trust is motivated toward a more uniform distribution in the turnover of construction commodity output by quarter of the year. The acquisition of profit and, consequently, the formation of economic incentive funds depend upon the fulfillment of this indicator. Therefore, Panevezhis builders are striving with all their might to provide for a precise rhythm for the startup program by accelerating the introduction of facilities. Thus, four facilities were to be introduced during the first quarter of this year, according to the plan, but 11 were turned over, and in the second quarter 17 were introduced instead of 19. As a result, 44.8 percent of the facilities due for startup during the year were introduced during the first 6 months, instead of the 31.3 percent called for by the plan.

At the same time, payment for credit increases as construction time grows. A reduction in the turnover of construction commodity output will reduce deductions into incentive funds. Unfortunately, construction is also experiencing the effect of this lever, and, as we shall see later, through no fault of its own.

The Equilibrium Has Been Disturbed

In erecting apartment houses and facilities for cultural and personal-services purposes, comparatively little equipment is required, and, for the most part it is of like type. The main thing here depends upon the builders themselves. The brigade contract is being used widely at such construction projects.

Erecting industrial buildings is another matter. The introduction of any production capacity involves the installation of various types of production equipment of a multitude of varieties, for whose delivery the client is responsible. In making up complete sets of equipment for an industrial construction project, there are tens of participants and, at times, hundreds of manufacturing plants. From time to time some enterprise violates the delivery schedule. Or the client displays sluggishness. A facility that is almost ready turns out to be minus parts, components or equipment that is trifling in monetary terms but operationally important.

It is impossible to produce industrial products, therefore there is no construction commodity output. This formula, which is correct, in practice omits punishment of the guilty. Only the general contractor has to pay for delay of an introduction. Obviously, he has the right to impose punitive sanctions against negligent partners. But this means hundreds or thousands of rubles of forfeit compared with the tens or hundreds of thousands that do not go into the construction organization's economic incentive fund. Moreover, it takes time to impose a fine, even a small one.

"The advantages obtained from Stroybank by reducing construction time for jobs," advised trust assistant manager for economic questions A. Shveykauskas, "does not compare in any way with the increased interest in case of a delay in introduction. We speed up, as a rule, the erection of housing and other uncomplicated facilities. The difficulties arise at large industrial construction projects. The amount of the credit, and, consequently, payment for it during erection of the enterprise are 10-fold higher than for housing. The trust paid Stroybank 76,000 rubles for increased interest charges in 1979, 94,000 in 1980, and this year the figures is expected to be 209,000 rubles."

A. Shveykauskas, the other trust economists and propagandists for the economic education system do not have an easy task. Actually, how do they explain to construction workers the paradox that the trust, while working still better, "loses" economic incentive funds? There were 154 rubles of material incentive funds per worker in 1979, 118 in 1980, and 79 rubles are expected this year.

The fact is that the measures for improving the economic mechanism in construction are still being executed, in practice, not in integrated fashion but only partially so. Some requirements are going in effect, but others are not. This is how the matter stands, for example, with regard to the list of construction project titles.

The construction project titles list comes into the Stroybank institution from the client with the deadlines for introduction indicated. This document is not coordinated with the one from the contracting organization. The plan serves as the builders' reference point, but other sums of funds and deadlines often figure in it. "Unforeseen circumstances" that arise on the part of the client compel revisions to be introduced. Accordingly, the Stroybank institution gets a changed list of construction project titles. The financiers assess this as a change of the

original deadline for introduction. As a result, after turning the facility over precisely in accordance with the plan, or even a bit earlier, the builders are deprived of a bonus for introducing it.

The CPSU Central Committee and USSR Council of Ministers decree about the economic mechanism prescribes that lists of construction project titles be unchanged throughout the whole construction period. Implementation of this requirement is of basic importance.

The Panevezhis trust has now managed to exact from one of the clients--an automatic compressor plant--the bonus not received by the builders. Alas, this is a unique case of mutual understanding. In most cases litigation is lengthy. The question is decided, at best, in a year. The motivating value of the bonus is lost. More often than not the client does not admit his guilt. This is what is happening at this time with the Ekranas plant.

The prevailing difference in wholesale and budget-estimated prices affects painfully the prime cost of construction, and, therefore, profit and incentive funds. As is known, it is planned that this divergence will be overcome during the 1981-1985 Five-Year Plan. The builders are still bearing substantial losses because of this anomaly in prices. In 1980 the differences in the trust were 44,000 rubles for silicate brick, more than 89,000 rubles for ceramic brick and stone, about 100,000 rubles for reinforced-concrete items, and 56,000 rubles for steel, reinforcement and tin. The picture is the same also for other individual line items. In all, the prevailing pricing disparity costs the trust 385,000 rubles per year, in round figures.

Questions Whose Time Has Come

The Panevezhis Construction Trust is understanding in regard to the temporary difficulties that arise. It is firmly known here that improvement of the mechanism is aimed at eliminating existing anomalies. Undeserved punishments and incentives for complete introduction of the new management methods are disappearing. Plan discipline is becoming stricter. It is all a matter of time. However, there are problems which can and should be solved now.

The total volume of construction operations--the "gross," which from now on is to lose its place as a settlement indicator--is stubborn in not giving up its dominating heights. The trust's economists have admitted that they make up reports for both the new indicators and for the "gross." We had already heard about this from Belorussia's builders, for whom construction commodity output and the introduction of facilities had become the main indicators earlier than for others. Obviously, the new management methods and the new system of indicators should also be reflected in the organization of socialist competition, including its indicators in a regional context.

This is all the more important because the brigade contract, which is aimed at obtaining finished construction output--the introduction of facilities--is becoming the basic form for organizing work at construction projects. In the Panevezhis trust the task of implementing the progressive method during the program for building housing, cultural and personal-services facilities and for 75 percent of municipal-services and 60 percent of the industrial and agricultural construction has already been set for this year.

The task is complicated by the fact that the trust's brigades are few in number and narrowly specialized. They operate in coordinated fashion in accordance with progress schedules by job. Nevertheless, not one of them is in a position to bring a facility from "scratch" to turnkey-type turnover. Each answers only for a set of operations. It is desirable that the trust's economists examine the possibility of applying to their construction projects the experience of Orel's builders with the flow-line brigade contract and the Vinnitspromstroy [Vinnitskaya Oblast Industrial Construction Combine] example of planning and complete outfitting directly in the consolidated brigade.

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CSO: 1821/055

CONSTRUCTION

GOSSROY COLLEGIUM NOTES MINISTRY OF CONSTRUCTION PROBLEMS

Moscow BYULLESEN' STROITEL'NOY TEKHNIKI in Russian No 11, Nov 81 (signed to press 13 Nov 81) pp 3-4

[Article: "Status of and Steps to Improve Construction in USSR Ministry of Construction Organizations"]

[Text] It was noted at an 18 August 1981 meeting of the USSR Gosstroy collegium that checks of the status of construction quality made in 1979-1980 by the Gosstroyinspeksiya with the participation of the Gosgrazhdanstroy, the union republic gosstroys and USSR Ministry of Construction organizations at 3,300 industrial, housing, civil-construction and agricultural projects revealed serious shortcomings in USSR Ministry of Construction work on carrying out measures aimed at improving construction quality.

In the final years of the 10th Five-Year Plan, construction quality deteriorated in the Uzbek, Georgian, Kirghiz and Turkmen ministries of construction, in the Glavnovosibirskstroy and in the Voronezh, Mari and Novgorod territorial construction administrations.

As before, the greatest number of defects were permitted in installing prefabricated reinforced concrete and metal components, in assembling monolithic reinforced concrete components, in masonry, roofing, plumbing and finishing work and in assembling rust-resistant covers. The quality of buildings put up in high-seismicity regions remains poor. Large-scale housing construction by USSR Ministry of Construction organizations in 1976-1980 was at a low level. Thus, the proportion of "satisfactory" houses put into operation in 1976 was 38 percent, and in 1980 -- 35 percent. Large-panel house-building enterprises have been slow to change over to producing new housing series. Some 47 percent of the large-panel housing still uses obsolete and rescinded series 1-464, 1-467, 1-335-AK and other housing plans.

Checks run on 76 construction industry enterprises showed an average of up to 29 percent of the output they produce meets All-Union State Standard requirements. At a number of plants, the enclosures being produced are too large, leading to increased heat losses in buildings and, in the case of tremors, to increased seismic stresses.

In 1979 and 1980, the ministry as a whole failed to carry out the state industrial output certification plan. Defects and damage in construction-installation work lead to unjustified expenditures of material and labor resources. A system of effective production quality control for construction-installation work and output produced was

not organized at many construction sites and enterprises. Substandard operational quality control was revealed at 63 percent of the projects checked. Unsatisfactory laboratory and geodesic monitoring was noted at 24-29 percent of the projects. Work was done without production plans or deviating from the resolutions in them at 57 percent of the projects. The efforts of Orgtekhnstroy trusts were inadequately oriented towards rendering construction organizations the necessary technical help.

Leaders of republic ministries, territorial construction main administrations, territorial construction administrations, trusts, house-building combines and industrial enterprises did not pay proper attention to solving problems concerning ensuring the necessary level of construction quality. The comprehensive construction quality control system has yet to be widely disseminated in subordinate organizations. There is inadequate monitoring of decisions made concerning improving construction quality and the quality of enterprise output.

The USSR Gosstroy collegium has instructed the USSR Ministry of Construction that it is necessary to:

eliminate the noted shortcomings. Ensure that questions of improving construction quality are reviewed and the necessary steps are taken, including those based on materials of Gosstroyinspeksiya checks, in all construction administrations, trusts, main administrations and union republic ministries of construction;

take steps to strengthen monitoring, to increase discipline and responsibility for carrying out decisions aimed at improving construction quality;

work out a comprehensive plan of organizational-technical measures for the 11th Five-Year Plan on fundamentally improving construction quality with a view towards: introducing a comprehensive system of construction quality control in subordinate organizations in 1981-1983, paying particular attention to organizing input, operational and acceptance control; creating and staffing a laboratory, geodesic and metrological monitoring service; widely introducing a system of defect-free labor and wages which takes quality into account at construction sites and enterprises; continue improving the technology and organization of construction-installation work and introducing progressive new components and materials aimed at improving construction quality; improve the quality of component and item manufacturing, ensure the certification of all output produced by ministry enterprises and achieve an increase in the proportion of output in the highest quality category; systematically broaden and update the assortment of items in accordance with national economic demands;

ensure mandatory acceptance of components installed by subcontractor organizations to produce subsequent construction-installation work at projects under construction;

take steps to increase the efficiency of Orgtekhnstroy trusts, improve the provision of construction sites with work plans and improve their quality, render construction sites greater assistance in introducing leading work methods; ensure that work at construction sites is done in strict accord with the methods and resolutions indicated in the work plan;

increase the personal responsibility of subordinate organization leaders for ensuring the required quality of work done; hear reports by union republic ministry of construction, territorial construction main administration, territorial construction administration, trust, house-building combine and construction industry enterprise leaders on work done by them to improve construction quality more often;

when building projects at model-demonstration construction sites, first achieve high quality of all construction-installation work and all items used. Create all-union schools of high construction quality at model-demonstration construction sites;

regularly examine questions of improving construction quality at meetings of the ministry collegium.

The Uzbek, Georgian, Lithuanian, Moldavian, Latvian, Kirghiz and Estonian gosstroys need to strengthen construction quality control by USSR Ministry of Construction organizations, paying particular attention to stability, seismic strength and durability of installations.

Jointly with Soviet of Peoples Deputies ispolkom architectural-construction monitoring agencies, the Gosgrazhdanstroy must strengthen housing and civil construction quality control, in particular, for the construction of demonstration-experimental projects. Systematically reveal instances in which unfinished construction has been accepted for operation and submit corresponding proposals.

The Gosstroyinspeksiya should work out proposals on improving the coordination and increasing the effectiveness of architectural-construction monitoring agencies, author's supervision and other monitoring agencies involved in construction quality.

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CSO: 1821/057

CONSTRUCTION

COMPLETION OF START-UP CONSTRUCTION PROJECTS URGED

Moscow IZVESTIYA in Russian 9 Aug 81 p 1

[Editorial: "Start-Up Construction Projects: On and Ahead of Schedule"]

[Text] Our country is one of new construction projects, a country of builders. The addresses of the heroic accomplishments of our builders are in the taiga of the Tyumen' North, in the desert sands of Central Asia, on the granite slopes of the Transcaucasus and in the verdant valleys of the Nonchernozem zone. The patriotic initiatives of Sverdlovsk builders, "Greater Volumes With Fewer Forces," and Rostov builders, "We Will Build and Utilize Ahead of Schedule," have spread to the construction sites.

"The new five-year plan will be a serious test for construction workers," Comrade L. I. Brezhnev stressed at the 26th CPSU Congress. "One characteristic feature of it will be the concentration of forces in every way possible on the fastest possible completion and start-up of those enterprises capable of providing the greatest increment in output and of loosening bottlenecks. We have already adopted this policy and must pursue it unswervingly."

This five-year plan, the party is orienting builders towards increasing capital investment effectiveness. Renovation and retooling will be the basis of the construction five-year plan. Much needs to be done to introduce progressive components with better factory finish at construction sites, to reduce expenditures of manual labor and to provide construction organizations with highly productive machines and machinery.

Some work has already been done along this line. However, the results for the first half of 1981 testify to the fact that by no means all reserves have been brought into plan in this area. The plan for putting fixed assets into operation, for starting up a number of production capacities, as well as for building housing, cultural and personal-services projects, has not been carried out. Many construction organizations have not ensured the planned labor productivity growth. At a number of start-up projects, including those carried over from last year, work is still far from completion. These projects generally have made poor use of construction equipment, operate set-assembly and transport organizations insufficiently precisely and flexibly, and permit high personnel turnover. All this leads to failure to start-up many important construction projects, as for example, those in chemical industry and ferrous metallurgy. The start-up of new capacities at "Sera" production association (Ministry of Chemical Industry) and a number of others being built by subdivisions of the USSR Ministry of Industrial Construction has been delayed.

Agricultural machinebuilding projects are construction sites of particular state importance, as continued growth in the availability of equipment to agriculture and implementation of the 11th Five-Year Plan food program depend in considerable measure on their prompt start-up. This year, we must put into operation large capacities at Khar'kov Tractor Plant, Altay Motor Plant and "Rostsel'mash," and new projects are to be put into operation at Tula Combine Plant and "Kazsel'mash." However, things are not going well at all start-up projects in the first year of the 11th Five-Year Plan. In particular, delay has been permitted in installing new capacities at the UkrSSR Ministry of Industrial Construction's Khar'kov tractor organization. The task today is to concentrate the material and labor resources of construction and installation organizations to the maximum at start-up projects so as to advance, rather than postpone, the schedules for releasing highly efficient new equipment and delivering it to kolkhozes and sovkhozes.

The "Basic Directions" defined a program of radical improvement in construction organization. During the five-year period, we intend to increase capital investments in the national economy by a total of 12-15 percent through all sources of financing, but the cost of each percentage point is rising appreciably. Capital investments must be directed foremost at renovating and retooling enterprises, as well as at completing construction projects already begun. The task set us is to bring the volume of unfinished construction and inventories of uninstalled equipment down to the normatives in the immediate future. However, these "unfinishes" are being completed slowly so far. And the estimated cost of certain new construction projects is unjustifiably high. At the same time, while the size of the construction program is increasing, specific capital investments per unit of capacity put into operation must be reduced and evenness in putting projects into operation in the course of the year must be ensured.

Construction collectives are called upon to make a maximum effort to put all start-up projects into operation on schedule. Particular attention must be paid to construction sites in branches which most effectively ensure growth in the well-being of the people, meaning the agroindustrial complex, its processing branches, and light industry. Much remains to be done to increase the capacity of the fuel-energy complex, chemistry and petrochemistry at accelerated rates and to strengthen the material-technical base of rail transport.

The experience of the leading collectives demonstrates that successes are achieved when the contract and direct-labor methods of running construction and installation work are continuously improved, when progressive forms of construction such as the unitized set-assembly, special-effort [vakhtovaya], nodal and others, are used. Experience shows that the labor of 12 workers is saved for each million rubles worth of construction-installation work done on projects being put up using the brigade contract and that creative cooperation among construction site participants following the "worker relay race" principle helps achieve good end results. But leading work methods are still being introduced slowly at five-year plan construction sites. It is the task of construction ministries and of local party and soviet agencies to create the conditions necessary for universal dissemination of the integral-process flow-line brigade contract on the basis of raising the level of engineering preparation and production-technological set-assembly. It is important to achieve a situation in which housing, social and cultural projects are put into operation as part of the production-capacities complex. Quite a bit needs to be done to reduce expenditures of manual labor in construction, to provide construction sites with equipment

to work under existing production conditions and to ensure uninterrupted deliveries of freight to construction sites.

Achieving a precise rhythm and organization in all links of the construction conveyor, strengthening planning discipline and, on this basis, ensuring the prompt start-up and utilization of production capacities means creating conditions favorable to successful implementation of construction plans in the first year of the five-year plan and carrying out the ambitious tasks set by the 26th CPSU Congress.

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CONSTRUCTION

DISCUSSION OF CAPITAL CONSTRUCTION MANAGEMENT CONTINUES

Moscow STROITEL'NAYA GAZETA in Russian 16 Aug 81 p 2

[Text] On 15 May (No 57), SG published an article entitled "En Route to Companies" by G. Lubenets under the heading "Management Structure and Methods." In publishing the article by UkrSSR Minister of Construction of Heavy Industry Enterprises G. Lubenets, the editors invited readers to participate in discussing pressing problems of the branch management system and to make concrete proposals on simplifying the structure in the "Management Code." Six articles have been published since that time. Today, we are printing responses by the USSR Ministry of Construction and Ministry of Industrial Construction.

Response by USSR Deputy Minister of Construction L. Bibin.

We think the article by UkrSSR Minister of Construction of Heavy Industry Enterprises G. Lubenets, "En Route to Companies," touched on important questions of improving capital construction management.

The USSR Ministry of Construction is now working out a draft general construction management plan which anticipates that the production construction-installation association or trust will be the basic (primary) management link.

Currently, many trusts have retained their traditional names but have undergone significant changes and have practically ceased to be autonomously managed.

Previously, both general construction and various specialized organizations, plants producing construction materials, items and components, quarries, machine and wood-processing shops, mechanization administrations and vehicle centers were subordinated to the trust. As specialization and cooperation have developed, the trust has been deprived of its independent decision-making capacity regarding a number of questions. It receives materials and components, construction machinery and motor transport from the outside. Sometimes, more than half the trust's construction-installation work volume is handled by outside subcontractor organizations.

The trust apparatus has become involved with the exact same questions as the apparatus of lower organizations (SU [construction administration], SMU [construction-installation administration], PMK [mobile mechanized column]), which has prompted many trusts to centralize the functions of lower-level organizations regarding

production planning, financing, personnel and other work, transforming them into production units. Thus, the trust has become the primary management link, with the rights of a socialist state production enterprise.

Under these conditions, combining trusts into a single, powerful territorial construction organization is natural. As distinct from the combines existing in the UkrSSR Ministry of Construction of Heavy Industry Enterprises, the organizations performing all types of construction work within an oblast and representing a complex multibranch system with a closed production cycle in the USSR Ministry of Construction are the territorial construction administrations (TUS). They are essentially large production construction-installation associations and the "Statute on Associations" approved by the USSR Gosstroy should be extended to cover them as well. In this regard, it is appropriate to retain the trust structure in them. More than two years of experience in operating the Kaliningrad production construction-installation association, created experimentally with a non-trust structure, has not yet yielded positive results.

The ministry considers it necessary to grant production units of the SU, SMU, PMK type comprising trusts and associations limited economic independence, while retaining their current accounts.

Comrade Lubenets is entirely correct in criticizing the now-obsolete procedure under which the USSR Ministry of Finance established annual assignments to reduce the size of the management apparatus. The ministry fully supports the remarks made apropos of this and thinks the existing procedure of allocations to maintain the management apparatus and assignments on reducing the size of it must be reviewed.

In their place, it is appropriate to establish differentiated normatives for the indicated allocations per million rubles of construction-installation work done by own efforts. If this is done, we will see an interest in consolidating existing construction organizations, rather than in creating new (and often small) organizations for which only the notorious allocations "limit" can be received under the current procedure.

Moreover, it should be borne in mind that, since 1978, the USSR Gosplan has firmly put into practice a procedure for planning indicators based on improving construction management. One such indicator is savings obtained by improving the organizational structure. This savings is taken into account when determining assignments on lowering the new cost of construction-installation work. It turns out that the reduction in expenditures on the management apparatus has doubled.

Many years of experience in the Glavzapstroy, Lithuanian SSR Ministry of Construction, Latvian SSR Ministry of Construction, Glavmosstroy and Glavleningradstroy have shown that, with a view towards simplifying the management structure, it is appropriate for construction ministries to include specialized sanitary engineering and electrical installation organizations. This provides an opportunity for organizing the construction conveyor in housing and civil construction, as well as in building simple production projects, without excess links. In this regard, the interests of the USSR Ministry of Installation and Special Construction Work are not touched in the slightest, inasmuch as it is still responsible for these types of work at large national economic construction projects and unique facilities.

The ministry supports G. Lubenets's proposals and thinks their implementation will help solve the problem of improving construction management as set by the 26th CPSU Congress.

Response by USSR Ministry of Industrial Construction collegium member Yu. Rakhmanov.

The questions raised in G. Lubenets's article are oriented towards strengthening the main cost-accounting construction production management link, the associations and combines.

In the USSR Ministry of Industrial Construction, as in the USSR Ministry of Construction of Heavy Industry Enterprises, construction management is done through oblast cost-accounting combines within a majority of UkSSR oblasts. The territorial management principle which has evolved brings the leadership closer to the construction sites and facilitates the development of specialization and the more efficient use of all resources in construction. This principle permits better coordination of the activity of economic management agencies with oblast party and soviet agencies.

The author's proposal that construction companies capable of doing all the work themselves, "from below-grade to turnkey," when putting up housing and sociocultural and personal-services projects deserves support.

We also consider it necessary to review the existing practice of annual assignments on reducing the size of the management apparatus and expenditures on maintaining it. It would be appropriate to replace annual assignments on reducing management expenses with planned budget contributions from savings from the implementation of measures outlined for the five-year period in the general construction management plans.

Commentaries from SG's labor economy and organization department.

Supervisory workers of the two ministries, as we see, support the basic proposals made in G. Lubenets's article "En Route to Companies." In this connection, it becomes necessary to ask additional questions stemming logically from the proposals made:

to leaders of the USSR Ministry of Installation and Special Construction Work: we request you state your opinion on transferring to general construction ministries and their subdivisions engaged in installing housing and public buildings certain specialized organizations, foremost electrical installation, sanitary engineering and ones installing prefabricated reinforced concrete;

to leaders of the USSR Ministry of Finance: we request you state your opinion on annual construction organization assignments on reducing expenditures on maintaining the management apparatus and their possible replacement by normative expenditure indicators.

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CSO: 1821/056

CONSTRUCTION

KALININSKAYA OBLAST SCORED FOR DELAY IN ADOPTING NEW SYSTEM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Aug 81 p 2

[Article by A. Volosatov, estimate-contract administration chief in the USSR Ministry of Construction: "End Product and Construction Site Plan"]

[Text] This five-year plan is a special one for construction. According to the CPSU Central Committee and USSR Council of Ministers decree on improving the economic mechanism (July 1979), beginning this year, the five-year plans of construction-installation organizations must establish an overall commodity construction output volume and one for work done by their own efforts. The document defines precisely what this means: the cost of construction-installation work on enterprises, lines, start-up complexes and projects ready to release output or render services which have been released to a client.

In this form, the new plan indicator is unquestionably an effective lever in the struggle with widespread shortcomings in capital construction. There seems no need to convince anyone of this. Inasmuch as the end product is the reference on whose basis the client calculates, construction-installation organizations concentrate their efforts and funds foremost on start-up projects. In so doing, the volumes of unfinished construction are reduced.

We could give dozens of examples to support this. In fact, issuance of this decree was preceded, as is known, by experiments in various republics and construction-installation subdivisions. In particular, in organizations of the Lithuanian SSR Ministry of Construction, the number of projects being built simultaneously was reduced from 1,161 to 995 in the first two years after changing over to evaluating their activity on the basis of commodity construction output. In subsequent years, the plan for putting production capacities and projects into operation was overfulfilled by an average of six percent and construction duration was cut by 12-15 percent.

Analysis of work under the new conditions convinces us that, when planning on the basis of finished construction output, providing projects under construction with financial resources on the basis of approved normatives and in accord with construction schedules acquires special importance. It is just such a procedure which most fully corresponds to the demands the 26th CPSU Congress made on construction workers in the current five-year plan, that forces and resources be concentrated to the maximum on completing and starting-up as quickly as possible those enterprises capable of providing the greatest increment in output.

Have these demands become unshakeable for all construction participants, for oblast and city party and soviet agencies which monitor local observance of statutes in effect? A sample check of intra-construction project titles lists and contractor agreements concluded for the current year in several subdivisions of the Kalinin territorial construction administration provides no grounds for an affirmative reply. Moreover, it shows that many clients, not without the help of obispolkom and gorispolkom leaders, are not at all ready to reject the practice of financing on the basis of the easy principle of "just latch onto the project."

It's a wonder that the titles list could be approved in the Kalinin gorispolkom for adding on a heating unit, for example. The estimated carryover for the project as of 1 January of this year was 802,000 rubles, and 19,000 rubles was included in the plan. And this unit has been under construction, so to speak, since 1979. Or take the public trade center. Its total cost is 139,000 rubles. The planned cost was 37,000. With the support of local agencies, the RSFSR Ministry of Agriculture has for the second year included in the plan construction of a turkey farm at "Krasnyy Luch" poultry farm, but has allocated only miserly sums. This year, its share is 100,000 rubles, given a total estimated cost of 855,000.

The number of such examples could be doubled or tripled, based on a generalization from the projects checked. Given an overall estimated cost of 20,348,000 rubles, clients have allocated for this year 1,568,000, that is, eight percent. The bank has correspondingly allocated smaller loans to contractor organizations as well.

These data testify to the fact that Kalininskaya Oblast has replaced the sign "calculations for projects and stages" with one of "calculations for commodity construction output," but the essence remains as before, with material-technical, financial and human resources scattered among numerous construction projects.

Let's examine this phenomenon from one other point of view. What do the Kalininers gain? For example, given such planning and financing, "Krasnyy Luch" turkey farm could hardly be tested this five-year plan and the new trade center would not be receiving customers in less than four years. However, it does not take great foresight to understand that local party and soviet agencies do not arrange such schedules for either the farm or the center, nor for many other projects. Pressure is put on a specific implementer and the work will be done above the plan, by diverting material-technical resources allocated by the ministry for start-up and very important national economic construction projects.

It is legitimate to ask what part contractor organizations play in shaping the plan. Existing statutes give them quite a few rights, among which are to accept or refuse to accept in the plan projects for which all the terms anticipated in the Contract Procedure Regulations are not met. The Kalinin territorial construction administration (administration chief, B. Klishov) was very slow to sign intra-construction site titles lists not backed up by financial and other resources to do the construction successfully, but in the end, its resistance was broken by the threat of being denied credit if a contract agreement was not concluded.

Unfortunately, local information bears out the fact that it is not just Kalininskaya Oblast that has permitted violations in shaping the commodity construction output plan. It would therefore seem that the new Capital Construction Contract Procedure Regulations being prepared by the USSR Gosstroy should anticipate measures on the

responsibility of client USSR ministries and departments, union republic councils of ministers, local Soviet of People's Deputies ispolkoms and leaders of enterprises, institutions and organizations for failing to ensure conditions for concentrating capital investments at start-up and previously begun construction projects. We also need to bring charges against specific individuals forcing the inclusion in titles lists of projects whose construction is not a top-priority necessity and concluding contract agreements on them.

We consider it appropriate to grant contractor ministries the right to stop construction on those projects for which clients have allocated insignificant allocations in relation to total estimated cost. Such steps will enable us to avoid scattering forces and means, to improve the engineering preparation of construction production, reduce the amount of unfinished construction and improve end results.

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CSO: 1821/056

CONSTRUCTION

CERTIFICATION FOR CONSTRUCTION ORGANIZATIONS PRESENTED

Moscow KHOZYAYSTVO I PRAVO in Russian No 8, Aug 81 (signed to press 11 Aug 81) pp 16-18

[Article by P. Voshchanov, section manager of NIIES [Scientific-Research Institute for Construction Economics] of USSR Gosstroy: "Construction Organization Certification"]

[Text] "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990" calls for the execution of a broad program of capital investment. Suffice it to say that capital investment in the national economy from all sources of financing will be increased by 12-15 percent during the 11th Five-Year Plan.

In the long term, capital investment will be aimed primarily at rebuilding and reequipping existing enterprises. Because of this, many contracting organizations will be reoriented to reconstruction work, while for some others the share of such work in the overall production program will grow 1.5-fold to 2-fold. It goes without saying that this restructuring cannot help but affect construction capacity (worker Manning and the availability of equipment), which should be ready to function in the specific environment of rebuilding enterprises.

The new basic guide for capital construction requires a balancing of planned amounts of construction and installing work with production capacity, which should be accomplished at all stages, both in the development and in the execution of five-year and annual economic and production plans.

Providing for such a balancing is at present one of the main areas for improving the economic mechanism in capital construction. Since it is an integrated problem, it requires, correspondingly, an integrated approach to solution, that is, an examination not only from the practical standpoint in regard to economic planning and analysis of the economic levers and stimuli but also from the standpoint of the legal mutual relationships that arise in the production sphere. Only a combining of the economic and legal aspects--mutual obligations fixed in contracts, the role of bank credit, and so on--can provide for successful solution of this extremely urgent national economic task.

Deficiencies in planning capital construction can be overcome and giving it a stable balancing can be achieved only where the production capacity of construction organizations is viewed by all participants as an objective limiting factor

in the formulation of plans for construction and installing operations. However, for this purpose, analyses of production capacity should be reflected in an appropriate document that will have the necessary legal basis. This document should be the construction-organization (construction and installing association or trust) certification. Its development has been called for by the CPSU Central Committee and Council of Ministers decree about improving the economic mechanism. It has been called upon to create objective prerequisites for the successful solution of the problem of balancing capital construction.

The certification in one form or another, or, more precisely, a document that corresponds with it in the structure of the information it contains, was compiled even earlier (in particular, it was developed in transport construction organizations in 1976-1980, mainly by SMP's [construction and installing trains]). However, it was not a legal standardization document and, therefore, little attention was paid to it in practice by either the superior organizations or the planning organs.

Imparting to the certification the character of a juridical document that regulates with precision the production potential of construction organizations changes the situation radically, making it an effective economic and legal instrument. Beginning in 1981 the development of certifications becomes obligatory for all the country's construction organizations. However, already today, the results of its development and its potential for practical use in planning can be judged by its first experience (for example, Trust No 17 of Glavmosstroy [Main Administration for Housing and Nonindustrial Construction in Moscow City] to which NIIES of USSR Gosstroy extended assistance in developing the certification).

It should be noted first of all that certification will permit the mutual relationships of the contracting construction organization with other operating participants to be determined more accurately. In particular, the mutual relationship with client organizations will be more definite and objective. Experience in developing plans (or drafts) during 1981 in organizations that are accomplishing certification indicates that under these circumstances there are fewer disagreements with clients, planning organizations and superior organizations, primarily in regard to such plan indicators as construction and installing work volume, its distribution by facility, dates for starting and finishing erection, and so on. Thus, certification of the construction organization will become a meaningful argument in substantiating the feasibility and strenuousness of the operating program planned for it, and an extremely important step will thereby have been taken toward overcoming deficiencies in the planning of capital construction as a whole.

At the same time, there are some unresolved problems about construction-organization certification that hamper this work, in particular a complete lack of the required standards and standard-practices support. For example, one of the central sections of the certification should be the specifications of the production capacity of the construction organization, as well as such specifications of its structural subunits. An appropriate All-Union standard practice, which is obligatory for use in planning construction work, is necessary for developing them. But, unfortunately, this is lacking at present. The use of branch recommendations during development of the certification does not serve the purpose, since the correctness of the computations can be formulated, but, where the concerned parties disagree, it will be the subject of doubt by clients, planning organs and superior

organizations, as was indicated, incidentally, by the work on making up the certification for Glavmosstroy's Trust No 17.

In our view, the main reason for the lack of the appropriate standard-practices procedures lies in the fact that prior to the 1979 adoption of the decree about improving the economic mechanism, construction organizations were oriented mainly to the fulfillment of tasks by construction and installing operations volume and not to the final result thereof--the introduction into operation of production capacity and of facilities. Under these circumstances the building organizations were economically motivated to a standard practice that would bring the amount of work they actually did as close as possible to their maximum capacity. This permitted formulation of a program that did not bring all available potential and reserves into operation. As a result, even with systematic nonfulfillment of the tasks for introducing specific facilities into operation, construction organizations could also have, and as a rule did have, extremely good results as to the total amount of work done. When construction organization activity is evaluated in accordance with commodity output, then their attitude toward the determination of production capacity and level of the construction program also will change. This is why a standard practice that discloses reserves for construction-work performance, which will provide for balance, strenuousness and realism in the planned construction programs, is needed even today.

In this connection, it must be noted that under the new conditions for management the attitude of client organizations toward questions of balance in capital construction should also be changed. At present, when capital construction plans are formulated they practically do not consider the production potential of the contracting organizations that will be charged with erecting their facilities. The clients' argument is simple: if construction capacity is not adequate, then it must be created.

Being guided exclusively by agency interests, clients have been, the same as before, unjustifiably increasing in their capital construction plans the number of facilities to be erected simultaneously. And even now, while being forced to consider the production capacity of the contractors, which is established in its certification, they often underestimate at the production-program coordination stage the initial cost of the facilities to be built. Thereby, only an appearance of balance in capital construction is created.

It would seem that if an organization's available capacity cannot provide completely for the execution of operations at that same facility, then it--this organization--should have the potential to increase its capacity or it should pose to its superior organization the matter of changing its production program (change of dates for starting and finishing operations, or transfer of the job to another organization).

Consequently, the client, in working out his own plan for capital construction, is obligated to consider the real potential for fulfilling it. His task will consist in assistance to the contracting organization in the formulation of a realistic and balanced construction program. Such an approach meets the interests of construction participants and, in the final analysis, national economic interests.

Further improvement of the economic mechanism will follow the path of creating a system of equal responsibility and motivation for all its participants to achieve

final results. And, in this sense, the work now being done to certify construction organizations and to evaluate their production capacity must be viewed as an initial and necessary step, the task of which is to achieve a balance in construction work performance, and, through it, a regularization of capital construction planning and a raising of its effectiveness, that is, achievement of the task that the 26th Party Congress set for capital construction.

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CSO: 1821/055

CONSTRUCTION

MORE LABOR PRODUCTIVITY NEEDED IN UZREK CONSTRUCTION

Tashkent EKONOMIKA I ZHIZN' in Russian No 8, Aug 81 (signed to press 5 Aug 81) pp 28-31

[Article by V. Skrebnev, UzSSR Gosstroy Chairman: "Paths to High Productivity"]

[Text] "In the environment of the 1980's," said Comrade L. I. Brezhnev in his Accountability Report of the CPSU Central Committee to the 26th CPSU Congress, "a thrifty and economical attitude toward labor resources becomes especially important. This is a matter that is complicated and requires the solution of many tasks of an economic, technical, social and educational nature." Questions of the effective use of labor resources in one of the largest branches of the national economy--capital construction--should thus be viewed broadly and as a factor in the plans of a number of entities.

Our republic's army of builders now numbers hundreds of thousands of people. During the last five-year plan they did an unprecedented amount of construction and installing work--14.35 billion rubles' worth. One can see from this figure alone what enormous economic benefit the branch achieves, even with a minimal growth of labor productivity. The price of each percent is almost 150 million rubles.

But still more important is the fact that the workers thus released can build numerous additional facilities that society vitally needs. Without a doubt it is on precisely this basis that the number of large enterprises and livestock complexes introduced into operation during the 10th Five-Year Plan reached almost 100 and that more than 27 million m² of housing, schools (through state capital investment) for 535,000 pupils and kindergartens for 145,000 children were erected. A multitude of facilities for social, cultural and personal-services purposes were built, among which the following can be singled out: the Tashkent subway, music and drama theaters in Dzhizak, Urgench and Nukus, the Friendship of Peoples of the USSR Square with the Palace imeni V. I. Lenin, the Palace of Aircraft Builders in Tashkent, and airports in Andizhan, Namangan and Termez.

The following data testifies to the growth of labor productivity in Uzbekistan construction work during the last five-year plan. In 1975, 105 man-years of work were required to do 1 million rubles' worth of construction and installing work, while 91 man-years were required in 1980. As a result of this, about 45,000 workers were provisionally released for other work.

Before saying whether this is much or little, something should be said about what made this result possible. Intensive growth in output at construction sites

depends directly upon reduction of the so-called wet processes there and increasing the amounts of installation of structure and articles that have a high degree of prefabrication. The development in the republic of a high-capacity construction-industry base--housing construction combines and plants for prefabricated reinforced-concrete and carpentry items--helped here.

By 1971 the level of fully prefabricated construction had reached 45 percent of the total amount of construction and installing work in the UzSSR Ministry of Construction and 48.2 percent in Glavtashkentstroy [Main Administration for Construction in Tashkentskaya Oblast].

And the share of large-panel housing in the total amount of housing introduced into operation this year was 55 percent for Minstroy [Ministry of Construction] and 70 percent for Glavtashkentstroy.

Industrialization of the construction project developed at a rapid pace during the Ninth Five-Year Plan. And, at the same time, the mechanization of construction work grew rapidly, and the pool of construction machinery and mechanisms increased. And, as a result, the average annual growth in labor productivity was substantial. In the republic's state construction organizations it grew 4.8 percent in 1971, 4.9 percent in 1972, 6.5 percent in 1973, 6.1 percent in 1974 and 6.1 percent in 1975.

During the 10th Five-Year Plan the pace of growth in fully prefabricated construction and in large-panel housing construction was reduced somewhat--a period of saturation having set in. But in 1980, nevertheless, in the Ministry of Construction 64 percent of the housing erected and 70 percent of the construction and installing work performed employed prefabricated structure. And the figures for Glavtashkentstroy were, respectively, 83 and 64 percent. A considerable shift in this area occurred in the UzSSR Ministry of Rural Construction. In 1980 the level of fully prefabricated construction reached 41 percent there, and the introduction of large-panel housing reached 36 percent of the total.

The level of mechanization of various types of labor-intensive work continued to rise. By the end of the 10th Five-Year Plan almost 100 percent of earthmoving work, 92.5 percent of the concreting, 70 percent of the plastering and 80.3 percent of the painting work was performed by the mechanized method. The total number of construction workers engaged in manual labor was reduced by 3 percent during the five-year period.

An important lever in improving the organization of construction and in reducing construction time was introduction of the brigade contract. In 1980, 5,239 cost-accounting brigades were at work on construction ministries and agencies versus 936 in 1975. These collectives did 1,263,000 rubles' worth of construction work during the year, or 43.8 percent of the total. And labor productivity in the contract brigades turned out to be almost one-third higher than in ordinary brigades.

The cost-accounting general-construction and installing brigades of A. Zazulin and N. Zborivets from Minstroy, G. Shukshin and A. Revozhitdinov from Minsel'sstroy [Ministry of Rural Construction], T. Samigov and M. Khabibullayev of Glavtashkentstroy, B. Abduzhabarov from UzSSR Goskomvodstroy [State Committee for the Construction of Water-Resources Facilities] and other workers who worked under the slogan: "During the five-year plan, give two five-year plans!" achieved substantial results.

Right now more than 30 percent of the finishing work is being done by the brigade-contract method. The collectives under S. Usmanov and Ya. Yantsen from Minstroy, A. Mamadzhanov, Yu. Tuychiyev and I. Khabibov from UzSSR Minsel'stroy and P. Savchuk from Glavtashkentstroy are working better than other brigades. On the average each member of these collectives is overfulfilling production norms 1.5-fold to 1.8-fold. Large-scale conversion to brigade cost-accounting is being accomplished in Uzbekshakhtstroy [Trust for the Construction of Underground Mines in the Uzbek SSR]. The creation of a system for supplying complete sets of operating equipment with materials delivered in containers and bundles on daily and weekly schedules has helped here. As a result, the trust's collective became the winner in socialist competition for wide introduction of the brigade cost-accounting method, high effectiveness of construction work and high work quality. Plans for labor productivity are constantly being fulfilled here.

Start-to-finish contracting flow-line operating groups have been functioning under a "plant-to-transport-to-construction site" system for several years now in the Fergana Housing-Construction Combine of Uzgradostroy [UzSSR Housing Construction Association]. This DSK [Housing Construction Combine] constantly fulfills the plan in all indicators and is the leading combine in Uzgradostroy of UzSSR Ministry of Construction. The average annual output per construction workers here was 22,000 rubles in 1980, which is 1.6-fold the figure for the association as a whole. Output in installing brigades reached 34,000 rubles. Each tower crane at the combine's jobs provides each year for the erection of large-panel apartment houses totaling 10,000 m² in area, at a time when the average corresponding indicator for Uzgradostroy is 6,000 m². All this together has enabled Fergana workers to reduce construction time for apartment houses by 25 percent below the existing norms.

The start-to-finish brigade has predetermined successes in the Akhangaran City Construction Administration. During the five-year plan the specific labor expenditure for each square meter of living space was reduced 1.6-fold here.

But when it comes to labor productivity growth in the republic's construction as a whole, great progress was not achieved here during the 10th Five-Year Plan, and there are many deficiencies and unused reserves that were correctly pointed out at the 20th Uzbekistan Communist Party Congress. A large number of contracting construction organizations, while carrying out annual plans for volume of work and introduction of facilities into operation, did not cope with the tasks established for labor-productivity growth. For example, in 1980 this indicator reached only 95 percent in Minstroy, 95.3 percent in Minsel'stroy, 98.3 percent in Uzbek SSR Goskomvodstroy and 94.1 percent in Glavtashkentstroy. For this reserve alone can yield an additional 50 million rubles' worth of construction and installing work.

On the whole, while the average annual pace of labor-productivity growth was 6.12 percent for the republic's construction work during the Ninth Five-Year Plan, it was only 2.86 percent instead of the 4.8 percent planned during the 10th Five-Year Plan.

The situation was especially unfavorable in UzSSR Ministry of Construction and Glavtashkentstroy organizations, where output for general-construction operations practically did not increase during the preceding 3 years. This is explained by the fact that such a reserve for labor-productivity growth as rise in the level of prefabrication of load-bearing wall and curtain-wall structure and certain other

structure that had been brought into operation during the preceding five-year period had been, in essence, exhausted.

But Uzbekistan's builders should do a larger amount of work during the five-year plan than during the 10th Five-Year Plan, in accordance with the 22-25 percent increase in capital investment. In this case, it should not be forgotten that, in accordance with 26th CPSU Congress decisions, this increase in work should be achieved without an increase in working numbers. Consequently, the builders must seek out new, still-unused sources of labor-productivity growth.

Frankly speaking, the many technical and organizational measures that should be undertaken quickly in order to carry out this task are fairly well known. In particular, a reduction in the share of manual labor, which is still very high in the republic's construction work, would be of enormous significance.

About 64 percent of the workers are engaged in manual labor. Working manually are 93 percent of the masons, 80 percent of the roofers, 64 percent of the plasterers and 60 percent of the painters. And manning by the representatives of these specialties is extremely great. About 40 percent of the workers of the general-construction ministries and agencies, for example, are doing finishing work. Output per worker of this large group is, in monetary terms, less than a third of the average output in subunits of these ministries and agencies.

The conclusion suggests itself: in design and construction work it is necessary to find technical and organizational solutions that will sharply reduce labor-intensive plastering, painting, roofing and transport and other work at job sites.

The output by construction-industry enterprises of structure and parts that are not brought to the degree of readiness called for by the GOST and by the terms for delivery should be reduced to the minimum. For example, apartment-house panels should have a level and smooth surface to which wallpaper can be glued without preliminary treatment, columns and crosspieces should have a clean surface layer, and so on. Most large-panel housing-construction and reinforced-concrete articles plants have special finishing lines and stations for this purpose.

There is the extremely severe problem of increasing factory preparation of woodworking products. Woodworking enterprises of the construction ministries and Uzglavstroydrevprom should deliver windows and doors, primed and painted, with hinges, handles, latches and locks installed on them. But such articles that arrive at the job sites are made from low-grade poorly dried lumber, and they often must be again planed, adapted and fitted, fixtures must be installed on them and a full set of preparatory and decorating operations performed. Estimates indicate that about 2,000 people are compelled to engage in this work directly at the construction sites.

Four-story brick apartment houses with a total area of about 300,000 m² are being built each year in the republic. Because of a shortage of facing brick and the generally low quality of the facing brick that is produced, the facades of such apartment houses have to be stuccoed. Another 300 people are engaged in this, if the labor expended periodically for repairing and restoring stucco is not counted.

Here is a graphic example of how a low degree of factory preparation of articles is reflected in the labor expenditures of construction organizations. Tashpromstroy

[Tashkent Industrial Construction Trust] in one half-year alone lost 2,300 man-days because of this, about 35 percent of it going to the fitting and hanging of carpentry items, 25 percent to additional priming and painting, 20 to the priming of wall panels and partitions, and the rest to the priming of reinforced-concrete slab and additional scratch coats for plastering.

The situation is similar in other general-construction organizations. However, the ministries and agencies are not hurrying to take steps to correct this. Last year the Ministry of Construction did not arrange for the output of 200,000 m² of carpentry items fully readied at the plant, although the designs existed. Glavtashkentstroy carried out only half of its measures for increasing the factory preparation of articles. And these organizations in particular planned to convert to the output of multiple-void and other slab with facing surface ready for decoration, for ceiling-floors, and to bring the production of wall panels with primed inside surfaces up to 8,000 m². There is a great potential for reducing the share of manual labor at construction sites in the wide distribution of mechanized handtools. However, the number thereof at the republic's facilities, unfortunately, is not great. Industry is lagging in the delivery of spare parts, and the quality of the means for small-scale mechanization leaves much to be desired. Little has been done by the builders to introduce this into operating processes, and they have not been concerned about good-quality repair of the tools.

This is why the finishing workers' output at Uzbekistan building projects is 1.5-fold to 2-fold lower in physical terms than in the country's advanced organizations, although it has grown by 10-20 percent during the past 5 years.

The introduction of new, effective building materials and structure is lagging, even with the large reserve for labor-productivity growth that is achieved by the high level of industrialization of construction projects. The use of IIS-04 series framework structure, for instance, yields a great advantage. According to UzSSR Gosstroy's task, the republic's design organizations have developed 120 standard designs on the basis of it, including buildings for schools and kindergartens, yet in most cases these are being built of brick. But everywhere the distribution of this series is being hampered by the shortage of capacity for producing the appropriate columns, crosspieces, panels and other members. The construction ministries and agencies should develop this production activity.

And three-layer panels for walls and roofs, whose output the Tashkent Lightweight-Metal Structure Plant of Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] should bring up to 1.4 million m² per year, are so effective! The integrated fully prefabricated construction of buildings for enterprises of light industry, the food industry, and other branches of industry can be organized on the basis of them. In this case, labor-intensive finishing work is reduced to a minimum.

The time has come to dispense completely with the construction of divider walls made of brick. But for this to become a reality, the Ministry of Construction Materials Industry should greatly increase the output of rolled-gypsum separation walls with surfaces prepared by the "float." But still, because of a shortage of it during installation, the plastering of small-piece materials in the republic consumes 200,000 man-days per year.

Talk has been going on for several years about expanding the production and use of sanitary-engineering booths completely readied at the factory. Half of the Minstroy apartments were to have been provided with such booths back in 1975. Even today this is still far off. Appreciable forward motion in solving this problem is not being observed, even in Glavtashkentstroy. Meanwhile, the work of 500 people is being expended on stick-built sanitary-engineering booths....

Still another potential for labor productivity growth is improvement in the use of the industrial base's capacity and also of machinery and mechanisms. The housing-construction combines, for example, have a workload that is only 75 percent of capacity. Because of this, housing construction with brick is being increased, and we have already spoken about the amount of manual labor for masonry work. The workload of the pool of machinery and mechanisms, according to Central Statistical Administration data, is 50-70 percent of the norm, and the rest is made up by manual labor.

And, finally, one of the central questions of the problem being examined is improvement of the use of worktime. Workday photography performed at various construction projects indicated that the average worktime loss is 8.13 percent. For this reason 160 million rubles' worth of work is not performed each year! Let us add to this 22 million more rubles that could have been assimilated had there been no full-day idle time, absences from work authorized by the administration and absenteeism. A firm barrier should be set up in the path of worktime leaks.

Chairman of the USSR Council of Ministers, Comrade N. A. Tikhonov, in speaking at the 26th CPSU Congress, said: "The party, in appreciating what was completed during the 10th Five-Year Plan, sees difficulties and deficiencies. We speak here primarily about the fact that it has not been possible to solve, as has already been noted, the problems of raising labor productivity...." Uzbekistan's builders realize that they are in arrears to the state. And there are all the possibilities for making good on the debt.

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CSO: 1821/055

CONSTRUCTION

BUILDING MATERIALS DEMAND OUTSTRIPPING PRODUCTION

Moscow SOVETSKAYA ROSSIYA in Russian 29 Sep 81 p 1

[Article by G. Bilyalitdinova: "Industrial Base of Construction Sites"]

[Text] The fourth quarter is the time of greatest strain for construction workers. They are faced with completing the start-up program. The task is complicated by the fact that many of the year's start-up projects' schedules for beginning operation were shifted to the last three months and a disproportionately high volume of work is upon them. Why is the calm at the construction sites often replaced by all-hands work, and the reverse? What keeps builders from working evenly? They themselves cite as one of the primary reasons unsatisfactory supplies of building materials such as gravel, cement, components and brick to the sites. How true is this explanation?

The statistics indicate that each year, our country produces enough crushed stone to build a road from the Earth to the Moon. In terms of glass and cement produced, we lead the world. Nonetheless, it turns out to be increasingly difficult for building materials industry to keep up with its partners. The gap is becoming increasingly perceptible with each passing year. At the same time, the principles of correct management demand outstripping development of capacities to provide construction projects with raw material. Otherwise, it will not be possible for contractors to put new plants, housing, schools and other industrial and social projects into operation smoothly and on time. The increasingly exacerbated shortage of materials is one reason for the growth in unfinished construction, which is currently 90 percent of the annual capital investment volume, instead of the allowable 67 percent.

The shortage of so-called non-ore materials is especially significant, tens of millions of cubic meters annually, although the reserves of raw material are in the billions of cubic meters in the Russian Federation alone. At many projects, especially in the Central, Volga-Vyatka and Western Siberian regions, they are especially scarce. And material brought in to construction sites is often of poor quality. About six million tons too much of cement annually is used for this reason. In order to gain a clearer idea of the size of these losses, suffice it to say that that is precisely how much cement industry will have increased its output by the end of the five-year plan.

The situation is sufficiently serious to force us to think it through thoroughly. Over the past 10-15 years, the rates of development of industry producing many building materials have lagged appreciably. For example, a majority of the brick plants

have not been retooled for 25-30 years. We clearly need to accelerate branch modernization and to install new, automated enterprises with highly efficient production which will produce a maximum yield. Only given such retooling will we be able to ensure capital construction growth and avoid the chronic deficit in resources.

It is foremost the builders themselves who are to blame for the fact that the rear lags behind the scope of the work. Their attitude towards their own base gives considerable grounds for unease. It would be hard to name a contractor ministry which has even once carried out the plan in terms of installing construction industry projects over the past 10 years.

When it was decided to build a grading-crushing plant in Tomsk, the oblast breathed easier, thinking a critical supply problem had been eliminated. What hopes they had for that enterprise! However, in the nine years since the foundation was laid the construction site has never had a full complement of workers. Even today, the project has only nine fitters, instead of the 100 it is supposed to have. Equipment brought in long ago is rusting under open skies. An estimate of the crushed rock the Tomsk plant could provide yields the rather high figure of six million cubic meters. That is the amount of this scarce material the builders themselves are essentially depriving themselves of. A similar situation has also developed in Novgorod. The local building materials combine is a Nonchernozem project and is under the special supervision of directive agencies, so this would seem to be a priority project on which to focus attention and effort. But USSR Ministry of Construction subdivisions have been running the work here very negligently and are now engaged in eliminating their own mistakes, serious deviations from the plan. The Ministry of Construction is putting up a large enterprises to produce ceramic items in Pechora, Pskovskaya Oblast. The normative construction schedule is four years, but builders have utilized a total of only one fourth of the funds allocated during the past five years. The ministry has not provided the project properly with material and technical resources.

Two other leading contractor ministries, the union Ministry of Construction of Heavy Industry Enterprises and the Ministry of Industrial Construction, are greatly indebted to their own "rear." The planning-estimate documentation for the Tulunskiy Reinforced Concrete Pipe Plant (Irkutskaya Oblast) was approved back in May 1968. A schedule of two years was set. Two five-year plans have passed now and expenditures have exceeded estimated costs by 12 million rubles, two million rubles worth of equipment has piled up in warehouses, and the end is not in sight. The plan is being reworked...for the umpteenth time! Before the local Ministry of Industrial Construction organization could bestir itself, quite a few changes had occurred in the construction norms and regulations. The start-up of the enterprise was postponed again, for an entire five-year plan.

Contractors put forward quite a few reasons to justify the delays at construction industry projects. In fact, many administrations and trusts are in difficult straits, overloaded with assignments, often poorly supplied with resources and equipment, and short of personnel. But why? Ministry leaders must orient collectives towards eliminating obstacles. Take that reinforced concrete and non-ore materials supply problem which so often stops work at construction sites. It can in part be improved by organizational measures, but it is much more important to put planned capacities into production promptly, mobilizing every effort to do so if forced to. But what actually happens? Assignments on installing the material base are carried out significantly less successfully than is the entire contractor ministry program. During

the last five-year plan, builders failed to utilize 600 million rubles allocated to develop the branch, exceeding the normative work schedules three-fold in the process.

At the same time, the return on enterprises already in operation and supplying construction sites with their output could be higher. Last year, production capacities of the RSFSR Ministry of Building Materials Industry increased significantly: new shops and plants capable of producing each year 335 million bricks, about 200 million slate shingles and nearly 2.5 million cubic meters of non-ore materials, for example. However, the level of equipment operation is considerably lower today than it was five years ago. On average, for various types of output, capacities are being used at only 85-95 percent. And plants producing prefabricated reinforced concrete components yielded only 65 percent of their licensed productivity in 1980. Up to now, equipment at the Checheno-Ingushskiy Cement Plant has not been operating at full yield and "Tuvaasbest" combine has been slow in reaching its planned level of production. The branch has quite a few reserves for increasing efficiency. Thus far, however, the growth in finished output has lagged behind development of the production base and the accumulation of capacities.

We need to strengthen the branch. And the first question to be answered is that of reorganization. Building materials industry requires definite restructuring. It is hard to conduct a unified economic and technical policy at enterprises scattered among dozens of ministries and departments. The management structure is muddled. For example, only 240 of the 1,900 plants and combines producing wall materials are subordinated to what is considered the lead ministry. The situation is the same with regard to slate, lightweight aggregates, reinforced concrete, and even cement. Some 64 departments are involved in crushed rock production, and only one fifth of the enterprises are subordinated to the USSR Ministry of Building Materials. And technical-economic indicators are appreciably higher in them. For example, labor productivity is 10 percent higher, output quality is better and product net cost is lower. Analysis shows that a centralized management level and the use of internal reserves enables them to work more efficiently than at departmental plants.

Concentrating building materials production within a single ministry would permit significant improvement in branch operation. Many years of experience prompt this conclusion. It is simpler to manage technical improvements, to plan and distribute output and resources, from a single headquarters.

Construction industry is the material-technical base of the construction site. The stronger it is, the more successfully the five-year plan's start-up program will be carried out.

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CSO: 1821/057

CONSTRUCTION

CAPITAL CONSTRUCTION IMPROVEMENTS URGED

Moscow PRAVDA in Russian 22 Oct 81 p 2

[Article by Professor and Doctor of Economic Sciences O. Kozlova (Moscow): "Running the Construction Project"]

[Text] Intensifying production in every way possible is a pressing problem in all branches of the economy. This relates to capital construction as well. But one of the important levers for solving the problem is to improve branch management. How? The main direction was pointed out in the resolutions of the 26th Party Congress and in the CPSU Central Committee and USSR Council of Ministers decree on perfecting the economic mechanism.

I should like to focus attention on just a few questions of improving construction production efficiency.

Industry workers often complain that builders are very slow in building new and renovating existing enterprises. But at the same time, they forget that they themselves stand in great debt before construction workers. For example, machinebuilders have thus far been unable to create a full complex of mechanisms to do construction, installation and finishing work. As a result, some machines, mainly large ones, stand idle and there are not enough so-called "small-scale means of mechanization."

Only an insignificant number of brigades are provided with standard sets of tools and accessories. And when the rhythm is upset in sectors needing the simplest accessories, it is hard for even the best leaders to manage the construction process. Eliminating these disproportions is a large reserve for improving production efficiency.

Freight shipment is no less important a problem. Construction uses many resources -- metal, cement, reinforced concrete components, brick. It is therefore appropriate to make greater use of containerization and packetization. But these progressive methods of shipment are poorly developed. All operations are ordinarily done by inefficient methods, increasing the proportion of manual labor and diverting considerable people to this work. Due to shortcomings in material-technical supply, plan assignments are not met in considerable measures and normative construction schedules are not followed. Were the planning agencies and machinebuilding ministries to resolve these problems more actively, things could be improved in the branch.

The fact that the number of small organizations in construction is still high also has a pernicious effect on increasing production efficiency. Thus, by the end of the 10th Five-Year Plan, the average annual work volume of the primary construction-installation subdivision was about 2.5 million rubles, while specialists and managers are aware that the highest technical-economic indicators are generally in organizations with large annual work volumes. It follows that the problem of consolidating subdivisions while simultaneously improving their structures is a very pressing one.

For various reasons, a situation has now evolved in which construction and installation within any one union republic is simultaneously being done by collectives subordinate to a number of ministries and departments. This leads to the isolation of production bases and to lower capital expenditure effectiveness. We need to correctly establish efficient territorial zones of activity for construction organizations. Extreme expansion of the territories being served increases the costs of shipping materials and parts from bases to construction sites, increases the time required to put up buildings and installations and complicates the efficient management process.

Neither can the fact that a number of construction ministries do not yet have general management plans be considered normal. When developing and improving such plans, it is important to pay particular attention to their comprehensive economic substantiation. It is appropriate to reduce the number of management links, consolidate construction-installation organizations, and create associations wherever possible. It is appropriate to define in the general plans the terms for concentrating resources at an optimum number of projects and balance all plans with the potential of the production bases.

A certain amount of experience has already been accumulated. The Glavmospromstroy and Glavmosstroy, for example, have created large construction-installation and specialized associations. With the help of scientific research organizations, they determined an optimum composition, capacity, intra-production facility structure and other parameters. Preliminary calculations show that the creation of general contractor associations with an annual work volume of 80-100 million rubles permits the purposeful concentration of all types of resources.

As a result, collectives have obtained additional opportunities for improving the economic indicators of their work. Construction-installation associations, as the main cost-accounting links, are also emerging as general contractors regulating interrelationships with clients, project collectives, suppliers and the Stroybank. They also monitor the activity of subordinate subdivisions. In this regard, the main administration apparatus retains such important economic activity sectors as long-range planning. It coordinates and exercises methods leadership of the work of functional services, concludes contracts, distributes bank credits and material resources, and monitors the formation and use of economic incentives funds.

We should note as one shortcoming the imprecise division of duties, rights and responsibilities among management apparatus workers. As a result, many of them are forced to make decisions without complete information on how things are going at the construction sites. Inadequate management process organization precision leads to unnecessary production outlays. At the same time, considerably greater use of standard systems, the organizational structure, forms of the economic mechanism and certain standards could be made in this branch.

A management system using regulations has been created at Moscow Management Institute imeni S. Ordzhonikidze. Essentially what is it?

It is known how important a role production management plays. But management labor and intensiveness are measured only by results. And the results are sometimes negative. Who specifically is responsible? Unfortunately, the rights and duties of each subdivision and each worker are rarely outlined clearly in current practice. Can this situation be changed? Of course. The management process consists of individual operations. We can define the time and sequence of each, as well as the number of actions for their precise implementation. This will permit the creation of unique management standards which will in sum comprise a regulation.

Regulated management brought down to the monitoring level provides an opportunity to measure the labor needed for each operation, to determine a measurement for it and to intervene effectively in the management process and the actions of each worker. We can thus achieve better results. Experiments conducted in industrial and civil construction and at RSFSR Nonchernozem Zone and Moscow projects have demonstrated the great effectiveness of regulated management.

And one other problem. The reference is to leading initiatives in construction. There is, I suppose, no other branch of production in which so many remarkable patriotic initiatives have been born over the past 10-15 years. Who does not know of the work of the Zlobinskiy cost-accounting brigades; everyone knows about the "Orlov Continuous" system of planning and reporting for construction collectives on the basis of commodity output. In a word, there is an intense search for better work methods and more effective production organization.

But the question arises of what the specific national economic return on the search is. Unfortunately, a majority of the initiatives have thus far been poorly disseminated. Why? Not because the ministries and departments are indifferent to innovation. It is probably a matter not only of administrative measures, but also of creating the economic conditions for introducing the experience. Just try to master that brigade contract, as ordered, when you cannot set up smooth work at the site, when related agencies like the motor transport system and the reinforced concrete products plants are operating unevenly and not providing needed materials and items on time.

The question is apparently this: leading experience in organizing production and labor in construction can be disseminated sufficiently broadly given high management standards. It is no accident that the percentage of Zlobinskiy brigades is higher than the national average in large construction-installation associations. Leading management structure creates a basis favorable to introducing the best experience.

And finally, about automating management. It is hard to lead production today without sufficient reliable information. Computer centers and automated management systems have been created in many construction organizations. The USSR Ministry of Industrial Construction, for instance, has created several dozen computer centers with modern equipment. On the whole, they have provided definite positive results.

However, automated control systems have thus far resolved a limited number of tasks and as a result are not providing the needed impact. This has occurred because all-around automation has generally been done without first setting up the economic and organizational foundations properly. With the help of scientists, construction organizations need to make an effort to make better use of the rich possibilities of automation.

CONSTRUCTION

DUSHANBE CONFERENCE NOTES NEW REINFORCED CONCRETE MODULAR SHELL

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 14 Nov 81 p 1

[Article by S. Sanin: "For Different Projects"]

[Text] An all-union conference was held in Dushanbe on "Monolithic and Reinforced Concrete Casings for Construction in Ordinary and Seismic Regions." V. I. Buryakov, a technical administration chief in the republic Ministry of Construction, talks about these progressive components and innovating them in Tajikistan.

"What are modular shells? They are primarily spherical monolithic and reinforced concrete spans which enable us to create large amounts of space under a roof with a small number of supports, as in sports facilities and production spans for industrial enterprises. Metal use is thus cut by nearly a third. Their designer is G. K. Khaydukov, professor, doctor of technical sciences, USSR State Prize winner and chairman of the All-Union Modular Components Commission (Moscow).

Modular shells are now being introduced quite extensively here. The most promising ones were used in the Olympics complex in Moscow.

In Tajikistan, Candidate of Technical Sciences Ya. Iskhakov, a docent at Tajik Polytechnic Institute, has begun working on development of modular shells for use in areas of high seismicity. A prototype has been used in building the production warehouse at the Dushanbe No 1 Reinforced Concrete Components Plant.

A sports facility to house enclosed tennis courts with a total area of about 2,500 m² is now being built with such shells in the republic stadium imeni Frunze. Only nine supports were required for this facility, enabling us to create two playing areas of 48 x 24 meters each. Similar plans have been developed for other projects.

The development of a monolithic shell for a sports facility was done by Tajik Polytechnic Institute, the republic Ministry of Construction and "Dushanbegiprogor" institute. The shell is 24 x 24 meters and is made right at the construction site from monolithic reinforced concrete. But we are already working to put up such shells using individual elements to be manufactured using reinforced concrete at the plant. Moreover, we plan in the future to develop 30 x 30 meter shells.

The all-union conference held in Dushanbe showed that modular shells are being widely used in building various types of projects.

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CSO: 1821/057

CONSTRUCTION

CLAVMOSSTROY WIRING TRUST EXPERIMENT WITH NORMATIVE NOMINAL NET OUTPUT

Moscow NA STROYKAKH ROSSII in Russian No 11, Nov 81 (signed to press 23 Oct 81) pp 24-28

[Article by Ye. Ryzhevskiy, deputy manager of Moselektromontazh-1 trust of the Order of Lenin Glavmosstroy: "Planning and Recording Wiring Work on the Basis of Normative Nominal Net Output"]

[Text] With a view towards finding an indicator for planning construction-installation work volume, labor productivity and evaluating economic activity which is more effective than "gross," Moselektromontazh-1 trust of the Order of Lenin Glavmosstroy has, since 1 January 1975, been conducting an experiment on introducing a new measure, normative nominal net output (NUChP). It does not consider the cost of material resources expended in construction-installation work.

The wiring organization chose the experiment for good reason. The fact is that the normative documents for determining the estimated cost of wiring work already delineated the cost of materials contained in price list No 8 as well as materials not recorded in price list No 1.

The share of material expenditures in overheads (tools, means of small-scale mechanization and inventory costing less than 100 rubles, work clothing, materials used in labor protection and equipment safety, office equipment, materials used for temporary structures, and so on) costs 1.6 to 2.1 percent of the total estimated work volume. These material expenditures, up to 37 percent of total overheads, are excluded when recording normative nominal net output.

The share of materials related to operating machines and machinery in a construction-installation organization comprises an insignificant cost, 0.02 to 0.05 percent of the total estimated work volume.

When working out estimates, normative nominal net output includes the following expenditures, in conformity with USSR Gosstroy decree No 83 of 9 June 1980:

estimated expenditures on basic worker wages;
machinery operation expenses (based on estimated cost or planned-calculation prices);
overheads (based on estimate norms, minus material expenditures). For wiring work, overheads are 75 percent of basic wages, and in the case of NUChP -- 75 percent times 0.63;
planned accumulations (based on the calculation norm).

Along with these expenditures, normative nominal net output includes the following additional sums:

additional expenditures for work done in the winter, in an amount equal to the estimate norms in effect, with a corresponding reduction factor set by USSR Gosstroy decree No 83 (additional sum from full estimated cost);

additional expenditures connected with higher wages for the middle categories of workers employed in construction. Applied to NUChP in full;

expenditures on building temporary structures and buildings using estimate norms in effect, with a 0.30 coefficient;

other types of limited and incidental expenditures anticipated by the estimates and recorded in full in the cost of installation work as due for a given volume of work;

current adjustment factors for estimated installation work cost;

the savings (or increased cost) from lower expenditures under the "materials" article;

the calculated branch-average norm of planned accumulations for the Glavmosstroy, at 20 percent of total direct expenditures and overheads (excluding the cost of materials).

The planned volume using normative nominal net output is determined as follows:

$$O_{nyqn} = \left(\frac{O_{cm}}{1.06} - M_{cm} \times K \right) \times 1.056,$$

where O_{nyqn} is the work volume using normative nominal net output;

O_{cm} is the work volume using estimated cost;

1.06 is a factor taking into account planned accumulations using the estimate norm;

M_{cm} is the estimated cost of materials used based on estimate norms for a given work volume;

K is a factor describing the planned level of materials expenditures per ruble of estimated materials cost.

Thus, in terms of economic content, the "normative nominal net output" indicator is part of the price of construction output, of newly created cost in a given construction organization. This measure eliminates from gross estimated cost total material expenditures based on estimated cost and so remains unchanged over five or more years, independently of change in the cost of materials, electrical components and items.

The normative nominal net output structure (as part of overall estimated work cost) is shown in Figure 1 [following page].

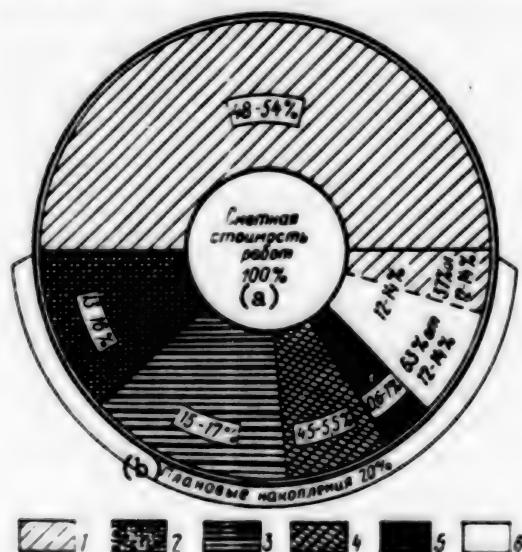
The actual work volume using normative nominal net output is determined as:

$$O_{nyqn} = \left(\frac{O_{cm}}{1.06} - M_{cm} \times K \right) \times 1.056 \pm \beta_n,$$

where β_n is the total above-plan savings (+) or overexpenditure (-) as against the planned net cost of materials expenditures.

A chart of the course taken by documentation in determining normative nominal net output in a trust special administration is given in Figure 2 [following page].

Figure 1. Normative Nominal Net Output in Total Estimated Work Cost (when determining NUCHP, 37 percent of total overheads as materials, components and the materials portion of overheads is excluded from the total estimated cost of the work)

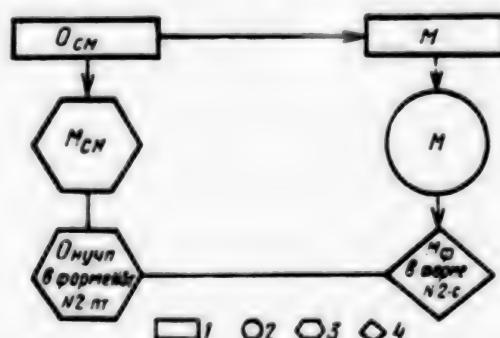


Key:

1. Materials and components
2. Savings from reducing the net cost of materials
3. Basic worker wage
4. Expenses on operating machines and machinery
5. Other direct expenditures
6. Overheads

a) Estimated cost of work, 100 percent
b) Planned accumulations, 20 percent

Figure 2. Chart for Determining Actual Normative Nominal Net Output



Key:

1. Installation sector (O_{sm}), (M)
2. Production-technical department (M)
3. Planning department (M_{sm}), (O_{nuchp} in the form $N3_t$ $N2-pt$)
4. Accounting department (M_f in the form $N2-s$)

[Designations in shapes correspond to formulas on page 2.]

The sector chief compiles documents on construction-installation work done or released in accordance with estimated cost and a materials report on the physical

amount of material-technical resources used and transmits them to the planning department. The latter determines the estimated cost of materials and sends the documentation to the production-technical department, which collates the materials used according to the normatives. The documents then go to the accounting department, which determines the cost of materials in terms of planned-calculated cost. The overall actual cost of materials must correspond in the reporting period for materials used to the analogous indicator in form 2-s reporting. The accounting department transmits the total actual cost of materials to the planning department for a determination of normative nominal net output, which must be indicated on form 3-t and form 2-pt.

Planning on the basis of normative nominal net output has substantial advantages over the traditional method. It resolves the important national economic task of reducing the cost of construction. This is confirmed by the fact that there is less effort by workers in construction-installation organizations to use more expensive but less efficient materials, since materials are excluded from reporting on amount of construction-installation work done and labor productivity assignment fulfillment.

NUChP is free of a number of the shortcomings of estimated cost: it is unaffected by change in the starting point of production; normative nominal net output volume is associated with the work of just the given construction-installation organization, since the cost of embodied labor consumed in production is not included in it; repeat calculations of embodied labor are eliminated.

The new indicator also resolves a second national economic task, that of saving material resources. A construction-installation organization is now interested in this, since, given the new measure, lowering expenditures of material resources ensures increased construction-installation work volumes and, as a result, increased labor productivity, creates additional rights to spend the wage fund and to increase the material incentives fund.

The division of construction-installation work into "profitable" and "unprofitable" is basically eliminated and the efforts of line workers to do only materials-intensive work to the detriment of construction production technology become pointless. In this regard, the more labor-intensive and machinery-intensive types of work become the "profitable" construction-installation jobs. In this connection, wirers have a practical opportunity to do labor-intensive work in the first stage, and foremost installing conduit, laying conductors to be coupled, installing panels and switchboards, drilling holes, that is, in accordance with the technology for building the project and, consequently, of ensuring that the work done is of high quality. It is thus no longer necessary to use administrative measures to ensure that labor-intensive installation work is done.

It also becomes possible to do promptly the primary directions in labor-intensive wiring: installing distribution and transformer substations, pump and ventilation panels, automation equipment, the electrical equipment of collectors, telephone weak-current and smoke-protection equipment, outside lighting, and others.

The new planning indicators evaluate more realistically and precisely the economic activity of the trust and its subdivisions when labor-intensive work is done in the concluding stage of putting up a project. Forces are better concentrated at start-up projects.

This system of planning facilitates a slight reduction in unfinished construction production, since labor-intensive work is done in the start-up period without lowering the economic indicators of trust subdivisions.

The quality and substantiation of operational-production plans are improved, the feasibility of sector plans is increased, and the reliability of the indicators and their coordination with book-keeping and the cost-accounting system is ensured. These indicators become the controlling ones at all management levels (sector, construction administration and trust). The possibility of using computers to calculate the plan opens up.

Nonetheless, calculated indicators are planned for installation sectors on the basis of construction-installation work volume in estimated cost. This is to be explained by the fact that a specialized administration is responsible to the general contractors for doing construction-installation work at full estimated cost.

Planning work volume and labor productivity on the basis of normative nominal net output stimulates the use of improved machines and machinery, means of small-scale mechanization and economical materials. NUChP facilitates a constant reduction in technological labor-intensiveness, since this becomes the main way of achieving growth in construction production volume, which in turn has a positive effect on other indicators, to wit, net cost, profit and return on capital.

The dynamics of normative nominal net output are close to those of construction production labor intensiveness. A comparison of the work of organizations in terms of labor productivity level calculated using NUChP becomes more objective. With the new measure, it is more feasible to monitor wage fund expenditure. It becomes possible to spend this fund economically, since changes in it are associated with the dynamics of live labor and do not depend on the dynamics of material expenditures. Measuring output per worker using NUChP better reflects fluctuation in expenditures of live labor and so more correctly describes the relationship of labor productivity growth rate and average wages.

A comparison of labor productivity growth rates and wages using normative nominal net output provides an opportunity for correctly planning and using the material incentives fund.

The new system of planning and recording the amount of construction-installation work done and labor productivity creates an opportunity to strictly observe one of the most important Leninist principles of socialist competition, which is the comparability of the results of those competing: brigades, sectors, administrations and even trusts, since embodied labor has no effect. All manner of working time losses are reduced more efficiently.

The primary advantage of the new indicator is that all elements of the cost of construction-installation work which describe expenditures of embodied labor and which are not directly connected with the size and labor-intensiveness of the production program of a given economic unit remain outside it, so to speak. Labor productivity therefore enables us to properly reflect the dynamics of this indicator, to plan the wage fund with greater substantiation, to set economically better-justified relationships between labor productivity growth and increased wages.

The relative simplicity of the calculation is an important merit of NUChP.

The new indicator will exhibit its positive impact on improving production efficiency and work quality in full measure only when all construction-installation organizations begin planning their activity on its basis. Of course, this will require much taut preparatory work to establish the total estimated cost of the work and the cost of the normative nominal net output, the cost of expenditures of live labor in the particular collective.

Basing plan indicators on NUChP will unquestionably also depend on the availability of construction subdivision capacities, on the prompt and proper preparation of production and the will of the labor collective, and also on precise material-technical supply.

Planning on the basis of normative nominal net output still does not ensure a link with the existing system of calculating for work done on the basis of estimated cost and how the cost of the assets being created is shaped. The volume of work done using NUChP does not create clarity in utilizing project construction estimates or in the actual level of technological readiness of the project.

The volume of contractor work based on normative nominal net output serves as a basis for determining the worker wage fund due for this amount, both when planning and when monitoring its expenditure and bank receipt of funds to pay those wages.

Output per worker is calculated in the established manner for NUChP, based on an evaluation of the amount of wiring work done based on this measure. The function between contractor work volume based on normative nominal net output and estimated work cost is expressed as a production volume factor determined by the relationship of indicators based on NUChP and on estimated contractor work cost. This factor shows what portion of the expenditures forming the estimated cost of the work determines the level of production effort by a given organization needed to perform these processes.

Since job authorizations and material reports must be totalled up prior to submitting documents on wage receipts for the month to the bank, an opportunity is created for promptly compiling the construction-installation organization production-financial activity balance and ensuring analysis of individual expenditure items in the reporting period.

Introducing the new criteria for evaluating economic activity is unquestionably progressive and will appreciably improve production efficiency. In fact, any measures -- technical, organizational, economic, social -- carried out will in the end lead to a reduction in labor intensiveness and to more profit, which are also taken into account in the complex of normative nominal net output indicators.

The new method of planning and evaluating economic activity plays a definite role in objectively reflecting structural shifts when planning and recording labor productivity, but it does not follow from that that it corrects existing shortcomings and blunders in construction organization production and labor organization.

An analysis of trust activity for a six-year period in which construction-installation work volume and labor productivity were planned using normative nominal net output has confirmed its progressive nature. All specialized administrations and the trust as a whole met the established technical-economic indicators under NUChP

quarter after quarter, year after year, and gradually brought their levels closer to the calculated estimated cost of the work.

The table below testifies to plan implementation in terms of basic trust activity indicators in recent years.

indicator	plan	actual	percent
construction-installation work volume (1,000 rubles)			
using normative nominal net output			
1978	9,018	9,853	109.3
1979	10,172	10,907	107.2
1980	11,051	11,314	102.4
first half of 1981	5,099	5,455	107.0
using calculated estimated cost			
1978	19,100	20,200	105.8
1979	21,275	21,867	102.8
1980	22,350	22,359	100.1
first half of 1981	9,450	9,522	100.8
output per worker (1,000 rubles)			
using normative nominal net output			
1978	6,715	7,043	104.9
1979	7,064	7,385	104.5
1980	7,427	7,735	104.1
first half of 1981	3,744	3,930	105.0
using calculated estimated cost			
1978	14,222	14,439	101.5
1979	14,774	14,805	100.2
1980	15,020	15,255	101.6
first half of 1981	6,938	6,850	98.9
work volume for finished projects and work stages (1,000 rubles)			
1978	19,100	19,716	103.2
1979	19,475	20,341	104.4
1980	21,250	22,231	109.3
first half of 1981, based on commodity construction output	6,564	8,115	123.6
balance profit (1,000 rubles)			
1978	4,224	4,978	117.8
1979	4,227	5,483	129.7
1980	4,273	5,623	131.6
first half of 1981	1,192	2,160	181.2
wage fund savings (1,000 rubles)			
using normative nominal net output			
1978	-128.2		
1979	-185.7		
1980	-115.7		
first half of 1981	-115.6		
using calculated estimated cost [concluded on following page]			

[wage fund savings (1,000 rubles)] [using calculated estimated cost]	[plan]	[actual]	[percent]
1978		- 27.0	
1979		- 59.3	
1980		- 75.8	
first half of 1981		- 30.9	

Since conserving and protecting material-technical resources facilitates increasing work volume under normative nominal net output, the collectives of specialized administrations have achieved rather good results along this line in carrying out the complex of organizational-technical measures to improve production efficiency. During the six-year period, the reduction in specific expenditures of materials was 0.3 to 0.8 percent annually.

Introduction of the new method of planning has facilitated improving the comparability of results when summing up the results of socialist competition among brigades and sectors. This applies foremost to cable laying and installing fluorescent lights and routing conduit, which had significantly different materials-intensiveness when calculated using estimated cost.

The trust collective carried out the 10th Five-Year Plan by 31 July 1980. In spite of the great amount of labor-intensive work involved in Olympiad-80 projects, the trust did not reduce its level of indicator fulfillment during 1979 and 1980.

High work indicators were achieved by wiring brigades with different materials-intensiveness. Among them were primary production collectives headed by V. Ushanov, A. Petrov, Yu. Mikhaylov, D. Danichev, V. Seliverstov, M. Kasatkin and A. Yegorov.

Working under the new planning conditions, Moselektromontazh-1 has systematically achieved high indicators in socialist competition among construction-installation organizations of Moscow, the capital's Sverdlovskiy Rayon and the Glavmosstroy.

The six-year experiment offers grounds for considering the search for construction production efficiency, while not yet over, to have taken a correct direction and for considering resolution of this task by gradually transferring all construction organizations to the new planning method to be an urgent matter which will permit a joint search for ways of accelerating putting projects into operation, introducing the commodity construction output indicator and improving the quality of construction-installation work.

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BUILDING MATERIALS

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ADVANTAGES OF ORGANOSILICON USE IN CONSTRUCTION TOLD

Moscow STROITEL 'NYYE MATERIALY in Russian No 12, Dec 81 (signed to press 26 Nov 81)
pp 10-13

[Article by S. T. Dement'yev, first deputy Chairman of RSFSR Gosstroy; N. P. Kharitonov, doctor of engineering sciences, professor and RSFSR Distinguished Worker in Science and Technology; V. A. Krotikov, candidate of engineering sciences (IKhS [Institute of the Chemistry of Silicates] of the USSR Academy of Sciences); D. I. Portugalov, engineer and RSFSR Distinguished Builder; and I. Ye. Soshnik, engineer and RSFSR Distinguished Builder (RSFSR Gosstroy): "Organosilicate Materials"]

[Text] "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990," which was approved by the 26th CPSU Congress, called for the creation and introduction into production of basically new materials, including polymers, and of compositions made from them.

The journal STROITEL 'NYYE MATERIALY published (No 6, 1981, p 25) an editorial note, "New Materials in Construction Practice," which told about organosilicate materials--new means for protecting constructional structure and articles--that were developed by the Institute of the Chemistry of Silicates imeni I. V. Gribenshchikov of the USSR Academy of Sciences and about their many virtues. Letters have come to the editorial office from organizations with the request that we report in more detail on the composition of organosilicate materials, methods for obtaining them, and their properties and areas of application. In publishing the article, "Organosilicate Materials," by Comrades S. T. Dement'yev, N. P. Kharitonov, V. A. Krotikov and others, the editorial board hopes that readers will obtain an answer to the many questions about these materials that interest them.

Organosilicate materials are on display at the Exhibition of Achievements of the USSR's National Economy.

Construction is in need of new and effective materials that are necessary, particularly in providing for reliable and long service of metal structure, buildings, structures, equipment, and various devices and machines that are subjected to high temperatures, ionizing radiation, vibration, atmospheric effects, various climatic conditions, various types of aggressive environments, and other rigorous conditions.

The Institute of the Chemistry of Silicates imeni I. V. Grebenschchikov of the USSR Academy of Sciences has developed for these purposes organosilicate materials whose properties exceed those of the traditional materials being used (perchlorvinyl, bituminous and other materials). They guarantee protection of constructional structure and buildings from corrosion and destruction and also the reliability and longevity of operation of various types of equipment.

The combining of high anticorrosion, electric-insulating properties, resistance to atmospheric effects, good adhesion to metals and to building materials, and heat resistance have enabled organosilicate materials to be recommended for use in solving various problems in the construction industry.

The service life of organosilicate materials as protective coatings under atmospheric conditions in some cases reaches 20-25 years without change of qualitative indicators.

Organosilicate materials are products of the interaction of high molecular weight organic compounds (organoelemental, particularly organosilicon), specially treated and dispersed silicates (asbestos, mica, talc and others), and oxides of a number of elements (chromium, titanium, zinc, zirconium, iron, manganese, cobalt, vanadium, tungsten and others). During interaction among the polymers, silicates and oxides, strong bonds emerge, including chemical bonds, that unite the components of the composition into a unified three-dimensional cross-linked structure.^{1,2}

With mechanical action on the organosilicate suspension when the material is being manufactured, a multitude of defects of structure arise in the tetrahedral and octahedral layers of the lattice of the layered silicate, and large concentrations of active centers are formed at the point of splitting of the Si-O bonds. The appearance of active centers on the silicate particles' surface while they are being ground and the mechanical destruction of the organosilicon polymer (polysiloxane) lead to a chemical grafting of the polymer molecules to the surface of the silicate particles.³ The siloxane-silicate material has a chemical bond between the silicate and the polysiloxane. During the mechanical action siloxane-oxide bonds form on the three-component polysiloxane-silicate-oxide system, along with the formation of siloxane-silicate bonds. A unified spatially cross-linked structure of the organosilicate material is formed when it is cured with heat treatment or under the influence of cross-linking agents at ambient air temperatures.

Polysiloxanes contain siloxane groupings of Si-O-Si atoms, groups of silicon and carbon Si-C atoms and residual silanol Si-OH groups. These groups of the polysiloxanes, which provide a chemical bond with the silicates and oxides, help to form a material that is resistant to various aggressive media and to the effects of high temperatures.

Polysiloxanes can contain linear and (or) branched and network structures. The first impart great elasticity, the second great heat resistance to the surfaces. In order to obtain organosilicate materials, polysiloxanes that contain elements of linear and branched structures are used, thanks to which adequate elasticity and heat resistance are provided. Polysiloxanes, to be acceptable for the manufacture of organosilicate materials, should have methyl CH₃ and phenyl C₆H₅ groups.

The water-repellant properties of polysiloxanes are occasioned by the orientation of the molecules, under which the polar Si-O bonds are directed toward the

protected surface, the organic radicals toward the environment. The polarity of the Si-O bonds determines the adhesion of the polymer to various surfaces. The adhesion of polysiloxanes is lower than that of organosilicate materials. The increase in adhesion of organosilicate materials is caused by the emergence in the polymer-silicate-oxide system of siloxane-silicate and silocane-oxide bonds. Many properties of organosilicate materials are determined by the organic framework of the polysiloxane. A separation of organic groups from the silicon atoms occurs under the influence of high temperatures or aggressive media. However, breakoff of the Si-C bond is hampered as a consequence of the fact that the silicon atom has, in addition to the hydrocarbon radical, an electrically negative substituent--oxygen--O-Si-R, which causes comparatively high chemical resistance of the polysiloxanes and organosilicate materials based on them.

The data that was obtained during a study of the thermal destruction of polysiloxanes in the presence of silicates indicates that water that the silicates adsorb affects the quality of the organosilicate material. The amount of water adsorbable by the silicates must be regulated. Therefore, silicates must be thermally treated prior to introduction into the polymer-silicate-oxide system. The temperature regime and time of mechanical processing depend upon the silicate introduced into the system.

The oxide components of the polysiloxane-silicate-oxide system take part in the dispersion of the inorganic components and, during mechanical cracking of the polysiloxane, at the stage of manufacture of organosilicate material, they catalyze the curing, aid structurization of the polymer, increase the physical and mechanical properties of the coatings and their adhesion to metals and to silicate materials, and take part in the forming of inorganic material and in high-temperature conversions at temperatures of 500-700 degrees C and higher. As a result of removing the organic framework from the main chain of the polysiloxane, active centers that are saturated with oxide components are formed by the silicon atoms. This makes it possible to obtain material of increased continuity, adhesion and hardness.² Destruction of the polymethylphenylsiloxane in the polymethylphenylsiloxane-oxide system starts at 300-400 degrees C, that is, at a temperature higher than for pure polysiloxane.

Oxides, like silicates, also affect the behavior of the material in different ways during its operation. With oxides of manganese, iron and nickel, the start of destruction of the material is shifted into an area of higher temperatures, but oxides of chromium, tin and zirconium lead to an expansion of the temperature interval over which the composition involved is destroyed.

Organosilicate materials are cured at temperatures of 200-300 degrees C. The specific curing regime depends upon the composition of the material.³ However, organosilicate-material curing can occur at positive (10-25 degrees C) and negative (down to -20 degrees C) temperatures by introducing into the organosilicate composition curing additives that do not degrade the organosilicate material's properties.

The potential for curing organosilicate materials at low temperatures has expanded greatly the area of their application.

Application technology of organosilicate materials consists of the following:^{2,4} the preparation of organosilicate suspensions for use (homogenizing, introducing the curing agent, and imparting the necessary viscosity); preparation of the

surface for deposition of the organosilicate composition (free of dust, dirt, oil, grease, corrosion products and dehumidifiers, and, for steel surfaces, sandblasting is desirable); application of the organosilicate suspension onto the surface by paint-and-varnish technology methods; and drying and curing of the coating.

The material is applied in two or three layers. Drying time for the first and later layers is 30-60 minutes after application. Total thickness of the coating should be in the 150-200 micron range.

Organosilicate material curing is performed under one of the following basic regimes.

Regime I. The composition includes the curing agent tetrabutoxytitanium (TBT, TU [Specifications] 6-09-2738-750; polybutyltitanate (PBT, TU 6-09-2647-75); 1-amino-hexamethylene-6-aminomethylenetriethoxysilane (AGM-3, TU 6-02-586-75); or methyl (phenylaminomethyl) diethoxysilane (product 119-95, TU 6-02-575-75). The structure and coating are cured in the air at a temperature of 15-35 degrees C for 72 hours prior to transporting. At the lower temperatures curing time is increased.

Regime II. The first layer of the coating dries in the air at a temperature of 15-35 degrees for 30-60 minutes, a second (or even a third) layer is applied and again is dried under the same conditions, and then it is heated up to 200+10 degrees C at the rate of 1-2 degrees C per minute and is cured at 200 degrees C for 3 hours.

Regime III differs from the second regime in maximum heating temperature (250-270 degrees C). Cooling occurs at a rate of not more than 6-8 degrees C per minute.

Thermal-radiation drying of organosilicate materials, which greatly reduces curing time to 1 hour, is also recommended.

In order to increase the resistance of organosilicate materials to alkalinity and to heat, thermal stabilization of them at 300, 400 and 500 degrees C for 2-3 hours, depending upon the specific operations conditions, is recommended.

The peculiarities of the structure and composition of organosilicate materials provide extremely valuable properties to coatings, seals and glues for operation over a broad temperature range, particularly anticorrosion properties (the protection of structural materials from the actions of aggressive gaseous environments and atmospheric factors, mineral-salt solutions and acids of various concentrations, and dilute alkaline solutions). Organosilicate coatings withstand the effects of high (up to 1,000 degrees C) temperatures for a long time and of 2,500-3,000 degrees C temperatures for a short time, and also low temperatures (-196 degrees C). They withstand the effects of oil, gasoline, tropical climates and solar and ionizing radiation. The ranges of the various temperatures, depending upon the composition of the material, are as follows: -70 degrees to +1,000 degrees C; and -196 degrees to +500 degrees C. Their service lives run from several hours to decades, depending upon a complex of influences (temperature, cyclicity of temperatures, and the presence of gaseous and solid aggressive agents).

Organosilicate materials are used effectively in construction and the production of building materials, thermal and atomic power engineering, the electrical-equipment industry, shipbuilding, the aircraft industry, machinebuilding, metallurgy, welding

operations, vacuum and cryogenic equipment, agriculture and restoration work in order to protect objects, structures and equipment against flames and corrosion. In order to determine correctly the area of application of organosilicate materials, the processes that they undergo in the various temperature intervals in the polymer-silicate-oxide system must be known. The forming of new phases (forsterite, enstatite and others) will affect the behavior of organosilicate materials in the higher temperature areas. The technology of application depends upon the concrete type of use (protective coatings, seals, glues, impregnation compounds and so on). In this case, the established technological requirements must be strictly observed in order that the materials will display their valuable properties fully under operating conditions.

The basic properties of organosilicate materials are as follows:

Range of operating temperatures, degrees C.....	-70 to 1,000;
	-196 to 500
Service life under atmospheric conditions, years.....	Up to 20
Resistance to 3-50 percent H_2SO_4 solutions, hours.....	Up to 3,000
Resistance to 3-20 percent solutions of KOH, hours.....	Up to 500
Impact strength in accordance with GOST [All-Union State Standard] 4765-59 (V-1), kg-force/cm ²	30-40
Hardness according to GOST 5233-67 (M-3).....	0.5-0.7
Strength of adhesion to steel, kg-force/cm ²	30-50
TKLR [temperature coefficient of linear expansion] ($200-300$ degrees C) $^{\circ}C^{-1}$	(1-2)10 ⁵
ρ_v , $\Omega \cdot cm$:	
at 20 degrees C.....	$10^{12}-10^{16}$
at 900 degrees C.....	10^6-10^7
E_p , kV/mm:	
at 20 degrees C.....	10-45
at 100 degrees C.....	3-8
$tg \delta$ (50 Hz):	
at 20 degrees C.....	0.01-0.1
at 700 degrees C.....	0.2-0.6
ϵ (50 Hz):	
at 20 degrees C.....	3-7
at 500 degrees C.....	6-9.5
Thermal conductivity, kcal/(m x hr) $^{\circ}C$	0.3-0.5
Heat capacity, kcal/(kg.degrees C).....	0.15-0.35
Cumulative integral dose of radiation, neutrons/cm ²	$10^{22}-10^{23}$
Coefficient of decontaminability.....	0.3-1.8

About 100 types of organosilicate materials have been created. They are produced in accordance with TU [Specifications] 84-725-78 and TU 88-633-12205-16-01-78. They are subdivided into groups: atmospheric resistant, special, oil and gasoline resistant, chemically resistant, heat resistant, and electrically insulating. OS-12 type atmosphere-resistant organosilicate materials have been disseminated most widely in construction. However, they should not be applied to protect structure that is used in aggressive liquid environments. For purposes of protecting pipelines of heating grids from corrosion, the composition OS-51-03 green is recommended.

Organosilicate materials have helped to solve some practical problems in construction: the atmospheric-resistant decorative and protective finishing of building

facades; the protection of embedded parts and installed connections from corrosion; the anticorrosion protection of underground pipelines and of pipelines used for other purposes; protection of the inner surfaces of gas conduits from low-temperature sulfuric-acid corrosion; the attachment of glass facing tiles to wall panels; the protection of metal structure, reinforcements for concrete, anchor bolts for the footings of contact-system supports on electrified railroads from electrical corrosion; and so on. The economic benefit from using 10,000 tons of organosilicate materials for atmospheric-resistant protection of metal structure and other protective and decorative operations is 30 million rubles. Lenmosttrest [Trust for the Maintenance of Bridges and Waterfront Features of the Roads and Bridges Administration of the Leningrad City Ispolkom] used organosilicate materials for protective and decorative painting of the metal structure of bridges for the first time. From 1966 to the present, 130 bridges across the Neva (Dvortsovyy, Liteyny, Stroitel', Ushakovskiy, Kamenostrovskiy and others) and across other rivers and canals of the city have been painted. The total amount of metal structure protected (spanning structure, facade surfaces, beams and web) during 1981 was 22,868 tons. In 1967 reinforced-concrete structure (the Novomoskovskiy Transport Tunnel in Leningrad) was painted with organosilicate coatings for the first time. Today these coatings have been applied to the reinforced-concrete structure of 50 transport structures (bridges, overpasses and tunnels). The total area of protected reinforced-concrete surface is 166,000 m².

According to Lenmosttrest's experience, the repair-free service life of coatings on metal structure is 12 years, for reinforced concrete 6 years. This is their advantage over the oilfree paints (the EP-58 and EP-71 epoxides, primer 329, perchlor-vinyls, and others) previously used by the trust.

Zapkhimremstroymontazh [Trust for Overhaul, Construction and Installing Work at Chemical Industry Enterprises of the Western Economic Region] has much experience in using coatings made of organosilicate materials for the anticorrosion protection of constructional structure and of equipment at chemical industry enterprises of the Belorussian SSR and the Baltic republics.

The total area of metal and concrete structure now being protected by these materials (during the period 1969-1980) at the indicated enterprises is more than 5 million m². Before wide use began, the coatings passed industrial-experimental tests that were held in various aggressive media and were recommended for the protection of constructional structure, equipment, and utility and service lines at which industrial gases (hydrogen sulfide, carbon disulfide, nitrogen oxides, ammonia, oxides of carbon and others), sulfurous, saline and sulfuric-acid steams, solutions of sulfuric acid (concentrations of up to 15-20 percent) and nitric acid (in concentrations of up to 15 percent), and dustlike salt sediments were active.

The annual economic benefit accruing from the lengthy service life of the coatings is from 0.24 to 0.4 ruble per 1 m² of protected surface.

VNIPIenergoprom [All-Union Scientific-Research and Design Institute for the Power-Engineering Industry] applied organosilicate materials in the painting of equipment and structure of open-air distribution installations of electric-power substations of the Mosenergo [Moscow Regional Administration of Power-Engineering Management] system. Two-layer coatings of the OS-12-03 gray composition (cold cured, on plates made of St3 steel--sandblasted and treated with P-1T rust converter or primed

with EVA-0112 primer-converter) successfully passed tests for resistance to the effects of distilled water, transformer oil and an industrial atmosphere.

According to VNIPienergoprom data and a test of use in the Mosenergo system, organosilicate materials can be recommended for painting electrical equipment at open-air distribution installations of substations (oil and air circuit breakers, transformers, metal and reinforced-concrete posts and supports, and metal cable ducts), replacing the perchlorvinyl enamels, bituminous varnishes and drying oils previously applied during repair of the indicated equipment. In this case, if the old coating has been destroyed down to the metal and is rusted, then the surface should be primed with a layer of stabilizing primer EVA-0112 before being painted with organosilicate material.

The Forestry Industry Academy imeni S. M. Kirov obtained positive results in a study of the possibility of increasing wood life by finishing it with organosilicate coatings made of OS-12 type compositions. The service life of wood and of woody materials is increased thanks to a considerable rise in resistance to moisture and to living organisms, and also to a reduction in inflammability.

Numerous experimental data and many years of experience in the use of coatings on specific objects under atmospheric conditions prove that organosilicate compounds are promising for obtaining facing construction materials that possess resistance to atmospheric effects and to cold in the various climatic regions. In Leningrad (the Pobeda Association, 1973) an experimental industrial line was created to produce colored facing brick with organosilicate coatings. The main line is a chain apron conveyor that passes through a painting chamber and chambers for accelerated curing and coating (heat treatment). The coating is an OS-12 type organosilicate material of various colors with a thinner (toluol) and curing agent (polybutyltinate or tetrabutoxytitanium). Introduction of the curing agent permits adequate hardness of the film coating to be obtained after a short (60 minutes) low-temperature (a maximum temperature of 100 degrees C) treatment.

The coating possesses good adhesion to the surface of clay and silicate brick and is salt tolerant. The characteristics of the structure of the organosilicate material itself show up positively in the operating characteristics of the thin layers of the coating: they are permeable to air and steam, are hydrophobic, and are dust repellent. The hardness of the film coating increases with time. The coating-application technology for brick is fairly simple.

Ten flow-type production lines for producing facing-type clay and silicate brick with an organosilicate coating, which have a capacity of 30 million bricks per year, are in operation in our country.

The virtues of organosilicate materials are a high degree of adhesion, both to clean metal and to old layers of paint; rapid drying (in 30 minutes); insignificant change in color during the whole period between overhauls; electrical insulating properties that enable structure to be protected from electrical corrosion; a potential for application in freezing temperatures, which greatly lengthens the season for painting work; and savings of food raw materials (replacement of the natural drying oils by the paint).

The effectiveness of using organosilicate materials in construction can be illustrated by the data cited in the table [next page].

Type of coating	Price per ton, rubles	Method of application	Consumption per 100 m ² , kg	Service life, years
For painting facades of brick, concrete or metal (according to data of Fasadremstroy* of the UKR** of Leningrad City Ispolkom)				
Perchlorvinyl facade paint	300	Sizing, priming and painting (2 layers)	Sealer--15 Primer--28.6 Paint--50	3 (Changes color in 4-6 mos)
Organosilicate materials	2,400	Painting (2 layers) without priming	30	15
Protection of contact-net supports and service installations of electrified railroads (according to data of the Electrification Service of the Oktyabr'skaya Railroad)				
Perchlorvinyl enamel	1,000-1,200	Over old paint without priming, 2 layers	50	1-3, depending upon nature of environment
Oil paints	800-1,000	" " "	30	" " "
Organosilicate materials	2,400	" " "	45	10 or more
Protection of metal structure and equipment of chemical-industry enterprises (according to data of Zapkhimremstroymontazh# of Ministry for the Production of Mineral Fertilizer)				
Perchlorvinyl enamel	900	Primer (2 layers) Enamel (3 layers) Sealer (2 layers)	90 (total for all materials)	0.5-2, depending upon service conditions
Epoxides	2,600 (primer) 2,100 (enamel)	Primer (1 layer) Sealer (3 layers)	Primer--40 Sealer--19	2-3
	2,600 (primer) 2,100 (enamel)	Primer (1 layer) Enamel (1 layer)	Primer--40 Enamel--12	2-3
Organosilicon enamels (type KO)	2,000-3,400	Without primer, 3 layers	54-60	1-2
Organosilicate materials	2,400	" " "	44	Up to 8, depending upon service conditions
Protection of metal structure and equipment of livestock-raising premises				
Oil paints	1,000-1,200	On sandblasted surface (during new construction), for old paint (during repair) without priming	30	0.5-1
Organosilicate materials	2,400	" " "	44	More than 7

*Building-Facade Repair Trust.

**Overhaul Administration.

#Trust for Repair, Construction and Installing Work at Chemical-Industry Enterprises of the Western Economic Region

The national economy's requirement for organosilicate materials grows each year. It now exceeds 100,000 tons per year. But the only enterprise in the country that produces these materials manufactures about 5,000 tons of them per year. One of the organosilicate materials (OS-51-03), which has been recommended for protecting heating-grid pipes from corrosion, is being manufactured in the amount of 600 tons per year, while the country requires 10-fold that much material. Limitation of the output of organosilicate materials is explained by the inadequate volume of production of organosilicon polymers. Industrial output thereof has not been receiving the required development for many years despite the fact that neither complicated equipment nor scarce raw materials is required for their manufacture. Repeated appeals to USSR Minkhimprom [Ministry of Chemical Industry] to increase the output of organosilicon polymers (varnishes) still have not brought positive results.

It seems that USSR Gosplan, USSR Gosbank and USSR Minkhimprom would take measures to increase the output of organosilicon polymers, which will enable organosilicate materials production to move ahead. The wide use of such materials for protection from corrosion will save the country millions of tons of metal and will lengthen the service life of various buildings and structures.

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METALWORKING EQUIPMENT

PROBLEMS OF MACHINE TOOL INDUSTRY EXAMINED

Novosibirsk EKO in Russian No 1, Jan 82 (signed to press 14 Dec 81) pp 23-46

[Article by Professor S. A. Kheynman, doctor of economic sciences, member of EKO editorial board, Institute of Economics of the USSR Academy of Sciences, Moscow: "Metal-Working Equipment: Technical Level and Competitiveness, The Industrial Organization of Machine Building and Machine-Tool Manufacture"; passages enclosed in slantlines printed in boldface]

[Text] The decisions of the 26th CPSU Congress devote an enormous amount of attention to machine building and metalworking. They set the tasks of accelerating the development of these industries, reequipping the machine-building industry with new metalworking equipment and improving the structure of the machine-tool inventory. Joint sessions of the commissions on industry of the Council of the Union and the Council of Nationalities of the USSR Supreme Soviet held in 1980 and 1981 have been devoted to machine building and machine-tool manufacture.

Why has the problem of the development of machine building and its core component, machine-tool manufacture, just now become a particularly urgent one? Intensification of our national economy requires sharp improvement in the level of equipment of all branches. At the same time, as pointed out in the decree of the CPSU Central Committee and the USSR Council of Ministers, "Substantially raising the technical level and increasing the competitiveness of metalworking, casting and wood-processing tools and equipment," despite the important advances achieved in Soviet machine-tool manufacturing, technical improvement within the industry is not proceeding at the required pace.

Our magazine has dealt with machine-tool manufacturing more than once. We have looked at the organization of the production of machine tools with numerical programmed control and discussed the experience accumulated by the Krasnyy proletariy plant, which came out during the Tenth Five-Year Plan period with the initiative "First-rate equipment for a five-year plan of efficiency and quality." We have thought it appropriate to come back to the subject of machine-tool manufacture in view of the fact that the matter of raising the technical level and increasing the competitiveness of metalworking equipment during the Eleventh Five-Year Plan is coming to acquire a particularly vital importance.

Excellent metalworking equipment--this means a higher class of motor vehicle and aircraft, extensive possibilities for development of the most complex radio-electronics

and instrument-manufacturing technologies, reliability in tractors and combines, improved domestic services etc. All this foreordains the greater requirements to be imposed upon machine-tool manufacturing, upon the structure of the equipment it turns out and upon its technical level.

It would hardly be proper if we were to be acquiring many types of equipment abroad instead of developing a capability for manufacturing these items ourselves. Participation in an international cooperation of labor is, of course, a progressive thing and in certain instances necessary, but only to the extent to which it is advantageous for the national economy. Important as well is the fact that excellent equipment means a possibility of manufacturing high-quality finished products and then selling them on the foreign market.

We open our selection of material with an article by Professor S. A. Kheynman, Doctor of Economic Sciences and a member of the magazine's editorial board, which will introduce the reader to the range of basic problems confronting our machine-tool manufacturing. A special round-table session has been devoted to a detailed discussion of these problems. Participants in the discussion showed great interest in the operation of the Ivanovskoye Machine-Tool Manufacturing Association imeni 50th Anniversary of the USSR, whose experience is discussed in the article by the association's general director, V. P. Kabaidze. In view of the pointedness with which the question of tool supply has been raised, the editors have given opportunity for comment by D. I. Semenchenko, Candidate of Technical Sciences and deputy director for scientific work of the All-Union Scientific Research Institute of Tool Manufacturing.

VAZ [Order of the Red Banner of Labor Volga Motor Vehicle Plant imeni 50th Anniversary of the USSR] representatives were unable to participate in the round-table discussion, but they have formulated their suggestions for improving equipment supplies in a separate article. Officials from Gosplan USSR and the USSR State Committee on Science and Technology have given the magazine an interview dealing with questions raised in the course of the round-table discussion.

Publication of this material does not conclude the discussion of the technical level and competitiveness of Soviet equipment. We hope to see it continued in readers' letters and new articles. For there are so many aspects to the problem!

[Article by S. A. Kheynman] The realization in production of new equipment and technology and the technical equipment of material production along with the non-productive sphere and our everyday lives depends to a decisive extent upon machine building. The product of machine building--its quantity and quality--is in turn to a very great determined by the structure and technical level of its production organization, which is a creation of machine-tool manufacturing and upon which the equipment of the machine-tool industry itself depends.

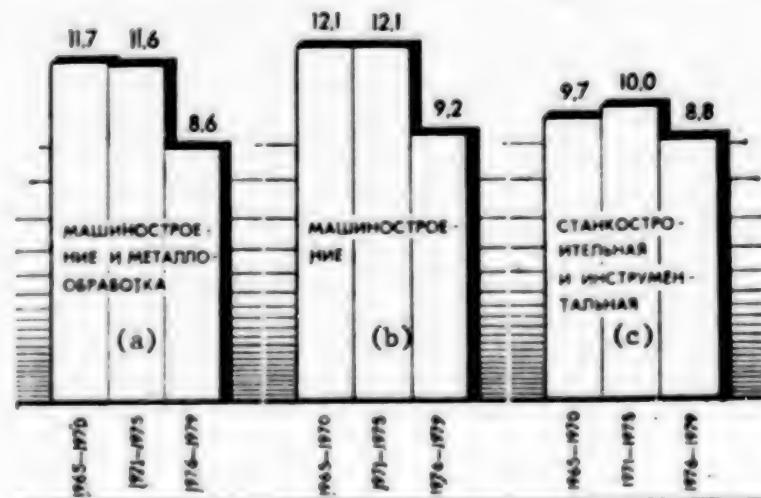
The tasks of the 1980's, formulated by the 26th CPSU Congress, and the challenges of the 90's--/"it is over precisely this period,"/ declares the CPSU Central Committee report to the 26th Congress, /"that we will be laying the foundations and erecting the economic structure with which the country will go into the 21st century"/--will require critical analysis and completion of each phase along the way as well as of the programs involved as a whole.

The party central committee and government are devoting great and unwavering attention to machine-tool manufacturing. Evidence of this is to be seen, among other things, in the decree "Substantially raising the technical level and increasing the competitiveness of metalworking, casting and wood-processing tools and equipment" adopted by the CPSU Central Committee and USSR Council of Ministers at the beginning of 1980 and the conference of machine-tool industry officials held with the CPSU Central Committee on 10-11 March 1980.

This led to the preparation for publication in our magazine of materials from the round table and a selection of articles dealing with problems in the machine-tool industry.

Prerevolutionary Russia had virtually no machine-tool industry of its own; this industry was developed during the period of industrialization spanning the three pre-war five-year plans. The year 1940 saw the manufacture of 58,400 metal-cutting machines (as compared with 1,800 in 1913) and 4700 forging and pressing machines (these were not being produced in 1913).

Despite the destruction of major industrial centers during the Great Patriotic War and the evacuation of a number of key machine-tool plants, 1950 was already seeing machine-tool production substantially exceed prewar levels--70,600 machine tools and 7700 forging and pressing machines (FPM). Machine-tool output has more than tripled over the past 30 years and reached 230,000 in 1979; in terms of value, machine-tool production has increased more than 20-fold, taking into account the most important qualitative improvements in the construction of the equipment; FPM output has risen 7.3-fold (56,300 units in 1979), 35.5-fold in terms of value. From 16 units in 1960, the output of machine tools with numerical programmed control rose to 8800 units in 1980. In terms of the number of machine-tools with numerical programmed control (NPC) manufactures, the USSR has taken over first place worldwide. Production of automatic and semiautomatic machine-building and metalworking lines rose from a single line in 1940 and 10 in 1950 to 174 in 1960, 579 in 1970 and 801 lines in 1979.



Statistical illustration. Average annual rates of growth in total production by branches of industry: a - machine building and metalworking; b - machine-building; c - machine and tool manufacturing.

This has made possible a rapid growth in the metalworking equipment inventory of the country as a whole as well as of the machine-building industry (its production apparatus). By 1980 it had substantially exceeded in terms of number of units the US machine-building and metalworking inventory, while the total inventory in our national economy had surpassed the inventory of metalworking equipment then in operation in all branches of the US economy plus the combined inventories of this equipment in the machine-building and metalworking industries of Japan and the FRG.

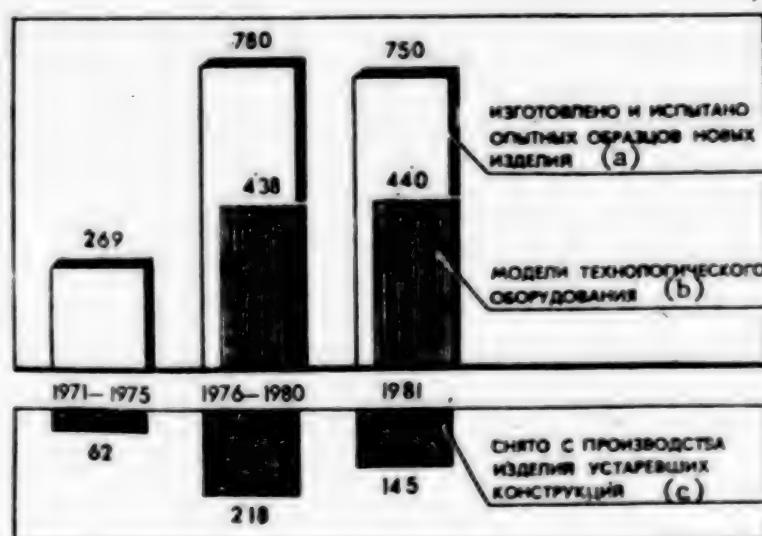
The output of equipment on these scales and the creation of this enormous inventory of machine tools and forging and pressing machines constitute a truly heroic feat on the part of workers in the machine-building industry and branches associated with it.

But in this connection we cannot fail to take note as well of the fact that the production of our domestic machine-tool industry has to a considerable extent formed and continuously expanded the "machine-building sector" of an enormous natural economy existing and even growing in all branches of our economy. Over the period we have under consideration here, 1962-1980, the inventory of metal-cutting machines in this "sector" grew 2.6-fold, that of pressing and forging machines 1.9-fold, 2.65-fold overall, more rapidly, that is, than the equipment inventory in machine-building and metalworking themselves (2.37-fold). To characterize the scales of this extramachine-building inventory of metal-cutting equipment it is enough to mention the fact that by the beginning of 1980 it comprised 44 per cent of the country's metal-cutting machines and 42 per cent of its FPM inventory. The number of machines involved here was greater than that making up the entire US inventory of machine-building and metalworking machines. This is evidence of the sharply increased capacities of our domestic machine-building industry (and metallurgy as well) and at the same time an indication of the problems remaining unresolved in the organization of our social production.

Substantial shifts have occurred in the structure of the production organization of the machine-building industry. The proportion of forging and pressing machines has increased. There were 17.2 per 100 metal-cutting machines in 1962, 20 by the beginning of 1980. TsSU SSSR [USSR Central Statistical Administration] unfortunately takes only very infrequent equipment inventories (1958, 1962, 1972 and 1981. The results of the last one have still to be published). We are therefore able to evaluate these shifts for only a 14-year period (1958-1972). They are entirely progressive in nature. The proportion of machines removing chips (lathes, planers, slotters and broaches) decreased from 36.2 to 33.7 per cent, while that of surface grinders increased from 14.1 to 16.5 per cent. The share of lapping and finishing equipment (honing, lapping and polishing machines), however, dropped from 2.9 to 1.9 per cent. The proportion of the most advanced types of equipment employed in electrophysical electrochemical working (first included in an inventory in 1972), unit machines and automatic lines rose from 0.6 to 1.6 per cent. The number of the latter in machine building and metalworking rose from 2965 in 1965 to 12,912 as of 1 July 1979, that is, 4.35-fold. Still another important result is the fact that by the beginning of 1980 the USSR counted some 70,000 units of equipment with programmed control (for the most part in machine building).

Despite all these clear-cut successes, the technical level and technological structure of the production apparatus of our machine-building industry in many respects still do not measure up to present-day requirements and potentialities, which naturally raises a number of most urgent problems requiring solution by the machine-tool industry and allied branches--the electrical equipment, instrument making and electronics industries.

Speaking at a conference of machine-tool industry officials in March 1980, Comrade A. P. Kirilenko, Politburo member and CPSU Central Committee secretary, declared: "Despite substantial advances, however, our technical progress in machine-tool manufacturing is still too slow. The structure and quality of the metalworking equipment manufactured by Minstankoprom [USSR Ministry of the Machine-Tool and Tool Manufacturing Industry] enterprises are far from fully measuring up to the tasks of introducing into the machine-building industry the advanced technological processes insuring the greatest growth in labor productivity, an increase in metal use coefficient and improvement in the quality of the machine-building industry product."¹



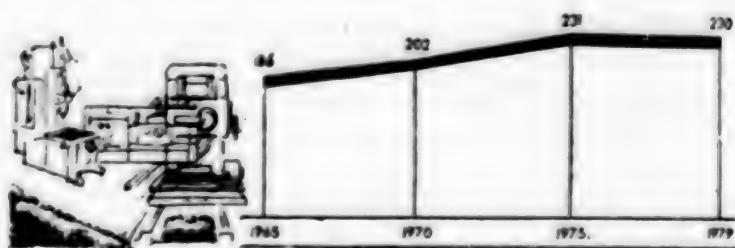
Statistical illustration. Production of new and the discontinuance of obsolete component designs in the machine-tool and tool-manufacturing industries in average number of items per year: a - prototypes of new components fabricated and tested; b - models of production equipment; c - components of obsolete design removed from production.

First, the /structure of the inventory/. Worthy of attention in this connection is the overall ratio between metal machining (and, accordingly, the inventory of metal-cutting machines) and the use of plastic deformation and welding (pressing and forging and welding equipment).

The ratio between metal-cutting and pressing and forging machines in the USSR in 1962 and 1980 was 100:17.2 and 100:20. The corresponding ratio for the US in 1963 and 1978 was stable at 100:31.4, that is, a more favorable and economical ratio. The analogous ratio for Japan in 1973 was 100:31.9, for the FRG in 1976 100:25.5 and for Great Britain (far from being among the leaders with respect to levels of equipment and technology) in 1976 100:21.6. The Soviet lag in the introduction of stamping and welding methods has its roots outside the realm of machine building--in the small proportion of sheet steel (and of thin sheet in particular) in the output of rolled metal products and the predominance, closely interrelated with this, in

equipment component design of an orientation toward solid rolled sections and casting. This distorts the structure of the machine-building production organization; increases the proportion of cutting and chip-removing machines and, accordingly, reduces that of finishing equipment; increases metal waste, adds to the weight of equipment and increases both the labor and capital intensity of machine building.

This cluster of problems requires an integrated solution. It will involve the simultaneous and well-planned reorientation of design development and equipment production technology in the direction of extensive substitution of the thinnest possible sheet for castings and solid rolled steel, an increase in machine building itself, radical improvement in the quality of rolling equipment for the production of sheet of the required characteristics and increased output of up-to-date pressing and forging and welding equipment and correspondingly limiting the production of metal-cutting machines.



Statistical illustration. Production of metal-cutting machines in thousands of units.

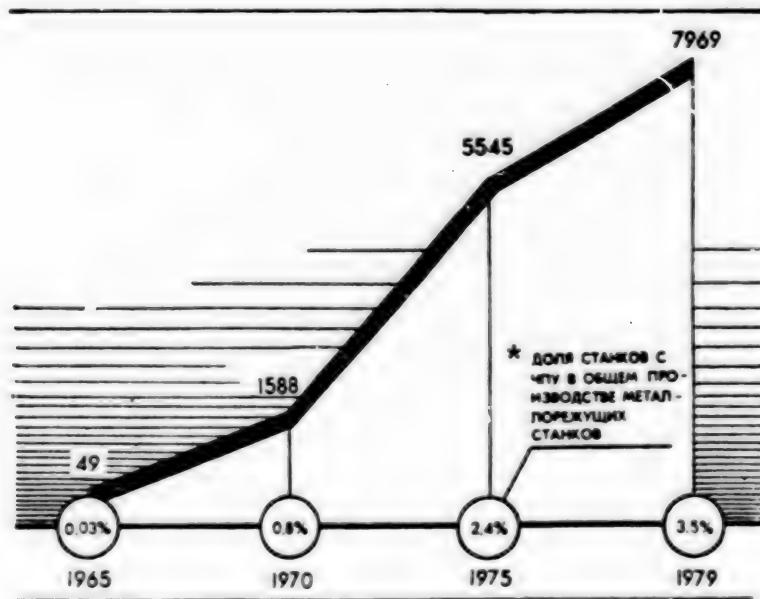
Some of the general trends in the structure of the US machine-building equipment inventory are worthy of attention. The number and proportion of machines for molding articles from plastics increased 4.11-fold between 1963 and 1978, that of pressure casting machines 2.04-fold. Their share in the overall inventory of all types of machines increased from 0.39 to 1.22 per cent--more than 3 times. Production of control and measuring machines and equipment not included in the 1963 inventory also increased, 21 per cent between 1968 and 1978, the percentage of this category from 1.55 to 2.02 per cent.

Finally, the most recent inventory (1976-1978) showed the US machine-building and metalworking industries to dispose of 925 laser machines (not counting measuring equipment employing laser technology) and 1623 industrial robots (manipulators). This means 3.04 lasers and 5.35 robots for every 10,000 units of machine-building and metalworking equipment. That comes to 3.53 and 6.15 per 10,000 units of equipment in enterprises employing 100 workers or more, 0.97 and 2.04 respectively for small enterprises with 20-49 workers. It is obvious that the statements of some Soviet scientists concerning the "laser era" and a "robot era" in connection with the US machine-building industry are as yet clearly exaggerated, which in no way detracts from the great promise held out by this technological product of the epoch of the scientific-technical revolution.

/Improvement in the structure of the production organization of the machine-building industry will require improvement in the ratio of machines producing the bulk of the

chips to finishers turning out high-precision pieces (grinders and surfacers)./ According to data from the 1972 inventory, for every 100 machines in the first category (lathes, planers, slotters and broaches) the USSR had 29.7 grinders (not counting bench grindstones, rough grinders and tool-grinding machines) while the US had 49.5; the USSR had 5.9 finishing machines, the US 30.3. This characteristic of the structure of the production apparatus has a substantial impact upon the characteristics of the equipment to be fabricated and, consequently, upon the very same characteristics of the final product turned out by this equipment.

The explanation for this is to be sought not only in the structure of the equipment inventory itself. We have to consider two other situations. First, the predominance of cast billets and merchant bars, which dictates a large role for cutting technology



Statistical illustration. Production of machine tools with numerical programmed control. * - percentage of machines with numerical programmed control within total production of metal-cutting machines.

and associated equipment. Second, the comparatively limited number of rolled shape dimensions (2-3 times smaller than in the US or FRG). The exceedingly inadequate output of precision rolled shapes approximating in their dimensional parameters the final product to be fabricated from them constrains the removal of large volumes of chips and so requires "chip-producing" machines. Accordingly, the problem must also be solved in conjunction with the machine-building, metallurgy and metallurgy machine-building industries.

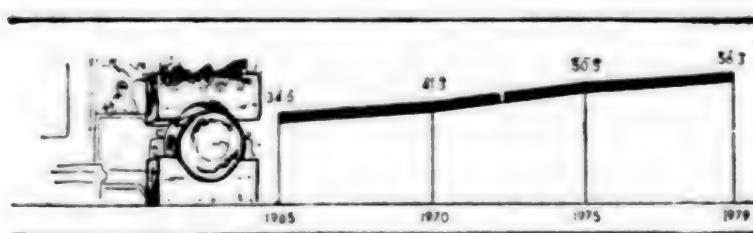
The piece rolling mills already being manufactured in the USSR are highly promising in this connection. The decisions of the 26th CPSU Congress contain the following:

"Fabricate piece-rolling mills, which permit the use of rolled metal stock with a minimum of waste scrap, and introduce them into the production operations of machine-building enterprises."

/Another important problem has to do with the proportion of the most advanced category of machines: standard-unit and multifunction machines, automatic lines and automatic assembly machines./ In 1972 the proportion of machines in this category in the USSR was 1.19 per cent; the figure for the US over the period 1976-1978 was 2.93 per cent. Electrophysical and electrochemical machines accounted for 0.4 and 0.6 per cent respectively.

The structure of the metalworking equipment inventory outside the machine-building industry remains considerably still less advanced. At the same time our machine-tool industry is being constrained to employ a substantial portion of its own capacities to produce the relatively primitive machines it needs but which impose much lower requirements for product quality and production standards.

/Any characterization of the production apparatus of our machine-building industry would be incomplete were we not to include a characterization of the rate at which it is being modernized./ The portion of equipment removed from the operational inventories of the USSR's machine-building and metalworking industries due to wear and

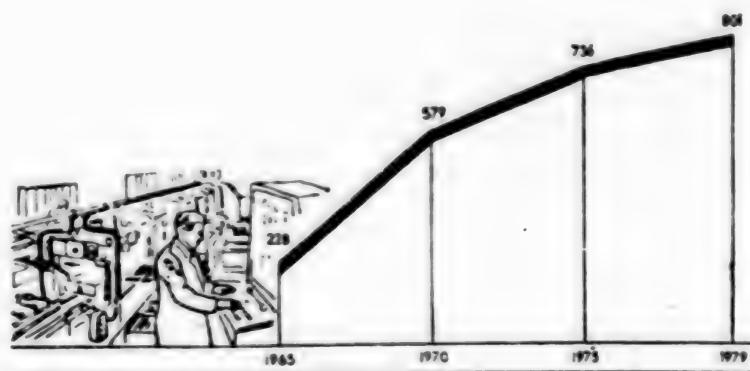


Statistical illustration. Production of forging and pressing machines in thousands of units. Note: Automated pressing and forging equipment accounted for 18.5 per cent of the total figure in 1975, 25 per cent in 1980. The plan calls for this figure to rise to 45 per cent in 1985.

deterioration was 2.1 per cent in 1973 and 1975 and 2 per cent in 1979. According to data presented in the course of the roundtable discussion by A. Ye. Prokopovich, USSR deputy minister of the machine-tool and tool-manufacturing industry, annual replacement figures in 1980 were 2.7 per cent for the USSR, roughly 5.5-6 per cent for the US and around 8-9 per cent for the FRG.

The low level of replacement is not compensated by the scales of modernization. Over a period of 4 of the years of the Tenth Five-Year Plan, 1 per cent of the equipment in the entire production equipment inventory of the machine-building and metalworking

industries was modernized. As can be seen from data published by the TsSU, the scales of modernization over the years of the Eighth, Ninth and Tenth Five-Year Plans did not increase, but on the contrary even decreased, taking the growth of the overall inventory into account. In this connection we should take into consideration the fact that we are now, as a rule, modernizing without participation in the effort on the part of the plants manufacturing the equipment involved, but rather on an in-house basis, ordinarily in the shops of the chief engineer's department, to a certain extent amateurishly and without participation by the principal bearers of technical progress in the production of that particular type of equipment.



Statistical illustration. Production of automatic and semi-automatic lines for machine building and metalworking in complete units.

What with the enormous scales involved in our machine-building inventory (and, incidentally, in that of many other branches as well), it is beyond the capacity of our economy to modernize it by equipment replacement alone. /The time has now come, in our view (and we talked about this during our roundtable discussion), to provide for the modernization of many types of equipment right in the process of designing a model for development./ This would strengthen the ties between the manufacturers and the purchasers of the equipment, increase the responsibility of the manufacturers and, most importantly, raise the technical level of the modernization and make modernized equipment as nearly like equipment that is in fact new.

The material published in this issue of EKO has shed light on a number of important problems having to do with the technical level of our machine-tool industry and its products as well as with the functioning of our machine-tool manufacturing industry overall and in its inter-relationship with the machine-building industry. The conditions and standards prevailing within the entire machine-building industry depend to a very great extent upon the tool industry. This is where the "tone" must be set, the "style" dictated. To a great extent the machine tool and its technical equipment is the culture bearer here. All problems are looked at from the point of view of these high requirements.

/We need to adopt an integrated, systems approach to evaluation of the technical level of a machine tool./ The capacity of a machine--the magnitude of the forces

involved, the effective rate at which the working implement (tool) acts upon the object of labor (the billet), the dimensions of the billets and pieces which can be worked and fabricated on it--all these factors are highly important characteristics of its technical level. To a very great extent they will be functions of the level at which the machine is equipped with regard to its various components--motors, drives and control devices, items which are fabricated outside the machine-tool industry, that is, by the electrical equipment, electronics and instrument-making industries. It is of course obvious that the most important component of a machine's technical level is the extent to which its operation has been automated.

What we are principally talking about now are those integral components of the modern machine machine tool which many times raise its technical level and increase the efficiency with which it can be employed--its electrical and electronic components and hydraulic and pneumatic systems.

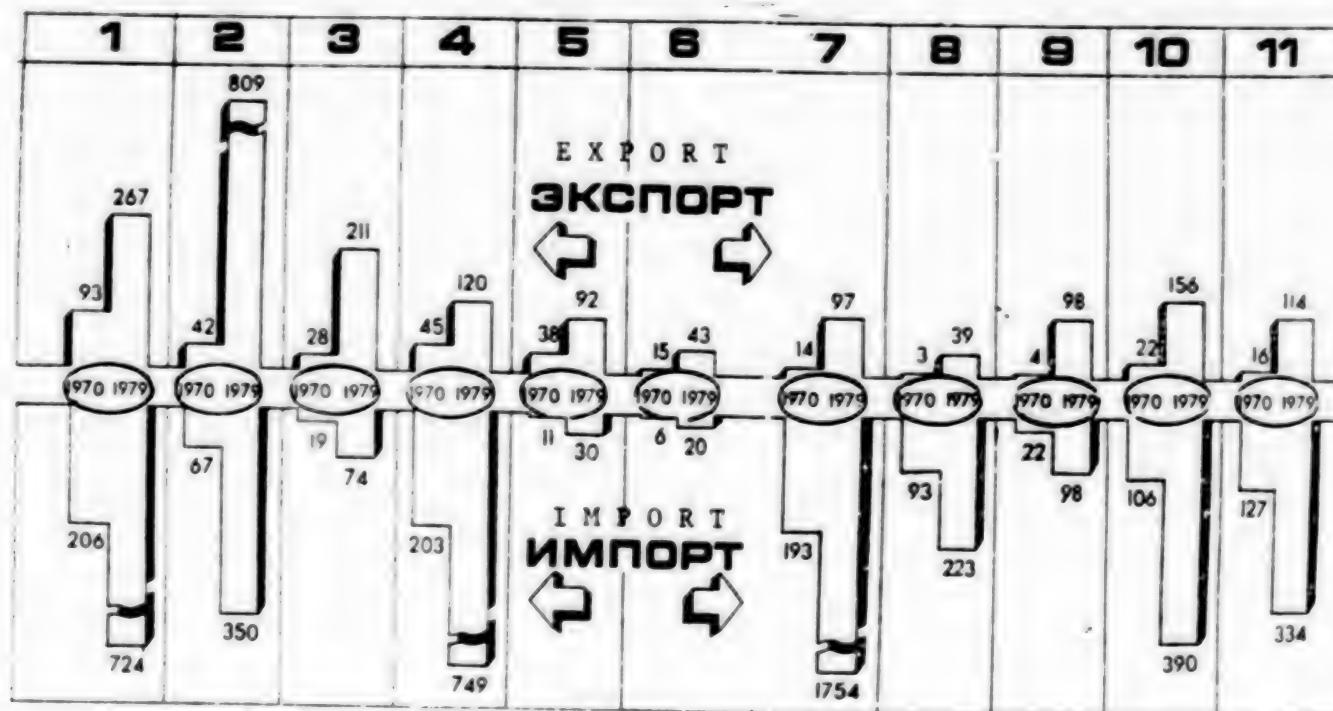
At the same time, of greatest importance are the conditions and economies characterizing the operation of a machine, its reliability, that is, its economically advantageous lifetime.² Today's machine tool must be equipped with an essential number of control and measuring devices (measuring and controlling not only the dimensions of the articles or semifinished items being fabricated, but the technical state of the working tool itself), diagnostic and loading and unloading equipment, a complement of working tools and operating equipment and, if necessary (in machines with NPC), the required amount of program "software."

Reliable, trouble-free operation will require a complement of replacement and repair units and parts (or component and assemblies necessary to modernize the machine), which the manufacturer should supply the customer for the entire operating lifetime of machines of the particular model involved.

The material published in this issue indicates that all this is now far from always being the case. If we are to speak of factors external to the machine-tool industry, it should be said that despite all the decisions which have been adopted, the electrical equipment, electronics and instrument-manufacturing industries are still failing fully to meet the requirements of the machine-building industry in either quantitative or qualitative terms. Nor, as many writers have pointed out, can we easily expect any fundamental improvement in the situation over the course of the Eleventh Five-Year Plan period. This will entail the expenditure of billions for the import of many types of machine tools, pressing and forging machines and lines, which are particularly necessary for the priority branches, as well as for the import of components and units in short supply. According to the evaluation of specialists, domestically manufactured programmed devices are lagging behind in their level of technical development. They can be characterized as having an inadequate range of functions, only small degrees of integration, poor reliability, large dimensions and high cost.

Consequently, almost half of the "working center" type of multitool machine with NPC manufactured in Soviet machine-tool plants are equipped with imported components.

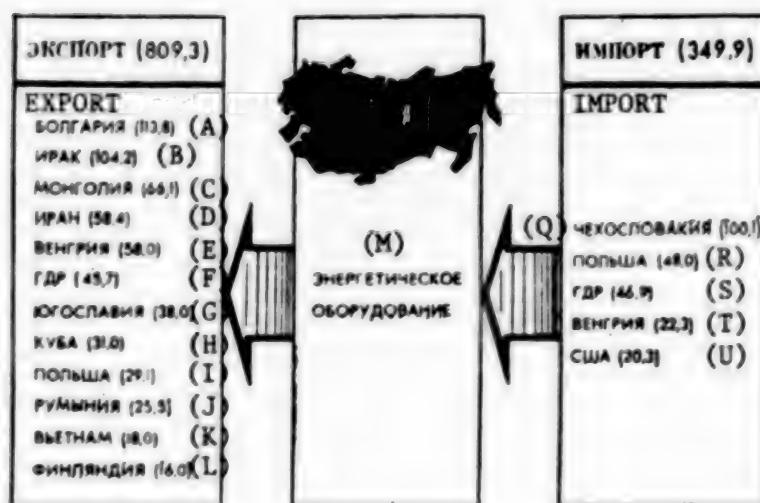
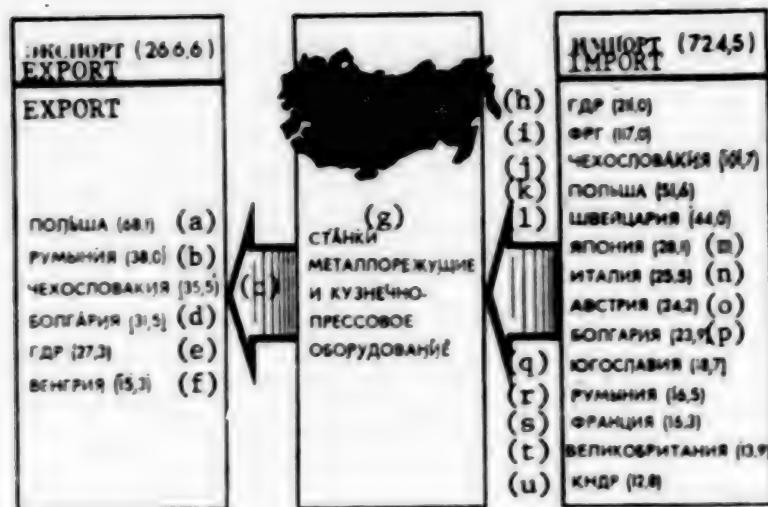
A sharp reorientation of the electrical equipment, electronics and instrument-manufacturing industries in the direction of the needs of machine-tool manufacturing is clearly required.



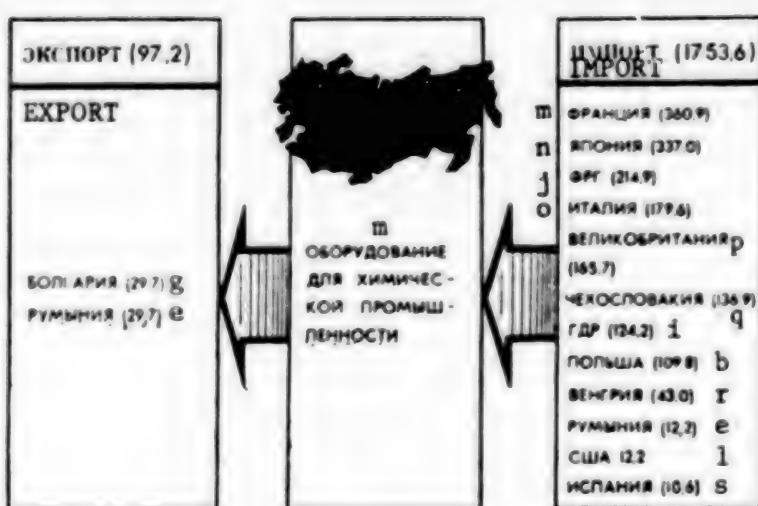
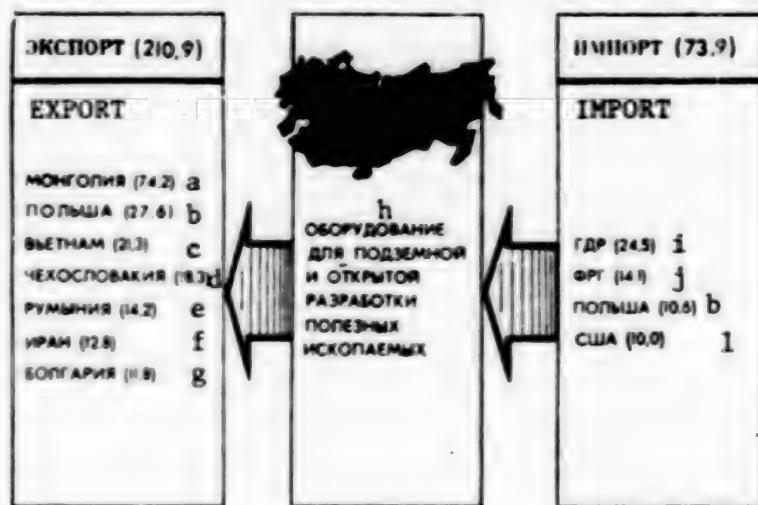
Statistical illustration. LEFT 1-6: Soviet export and import of equipment, rolling-contact bearings and tools in millions of rubles; 1 - forging and pressing and metal-cutting machines; 2 - power equipment; 3 - equipment for underground and open-cut mineral extraction; 4 - underground transport equipment; 5 - rolling-contact bearings; 6 - tools. RIGHT 7-11: Soviet export and import of equipment for various branches of industry in millions of rubles; 7 - for the chemical industry; 8 - for the timber, pulp and paper and wood-processing industries; 9 - for the construction materials industry; 10 - for the textile industry; 11 - for the food industry.

/The next problem involves not so much the technical level, but rather the economic rationality of the machine structure./ It is generally known that present-day machine building, both mass-scale and small-scale, involves a very high proportion of cutting and threading operations. Most of these operations in no way require the use of complex and costly screw-cutting and turret lathes. They can be successfully performed on simple and substantially less costly cutting and threading machines. In the meantime, for every 100 turning and turret lathes, the USSR has 7.2 cutting machines and 5.2 threading machines, 36.9 and 10.3 respectively the figures for the US, that is, 5 and 2 times greater.

Considering the key position of the machine-tool industry, what are therefore required are adequate investment and creation of capacities for production of the



Statistical illustration. Geographical distribution of Soviet exports and imports by country in 1979 in millions of rubles. NOTE: Only those countries included with export (import) volumes of at least 10 million rubles. a - Poland; b - Rumania; c - Czechoslovakia; d - Bulgaria; e - GDR; f - Hungary; g - metal-cutting machines and forging and pressing equipment; h - GDR; i - FRG; j - Czechoslovakia; k - Poland; l - Switzerland; m - Japan; n - Italy; o - Austria; p - Bulgaria; q - Yugoslavia; r - Rumania; s - France; t - Great Britain; u - PRC. BOTTOM: A - Bulgaria; B - Iraq; C - Mongolia; D - Iran; E - Hungary; F - GDR; G - Yugoslavia; H - Cuba; I - Poland; J - Rumania; K - Vietnam; L - Finland; M - energy equipment; Q - Czechoslovakia; R - Poland; S - GDR; T - Hungary; U - US.



Statistical illustration. Geographical distribution of Soviet exports and imports by country in 1979 in millions of rubles. NOTE: Only those countries included with exports (imports) of at least 10 million rubles. a - Mongolia; b - Poland; c - Vietnam; d - Czechoslovakia; e - Rumania; f - Iran; g - Bulgaria; h - equipment for underground and open-cut mineral extraction; i - GDR; j - FRG; l - US; m - chemical industry equipment; France; n - Japan; o - Italy; p - Great Britain; q - Czechoslovakia; r - Hungary; s - Spain.

special-purpose machine tools in extremely short supply for experimental and test work on the development of new equipment. We obviously, of course, cannot overburden the fairly limited capacities of this type with the fabrication of by-products. Krasnyy proletariy, for example, is making 30,000 roller movers, which could be made by less specialized enterprises. This constitutes some 30 per cent of the work load of the special-purpose machine shop. The Moscow Machine-Tool Plant imeni S. Ordzhonikidze is employing its facilities to manufacture 7x14 m press molds for housing-construction combines.

It is also very important that we achieve a sharp improvement in the technical level and quality of machine-tool production itself. Domestic machine-tool purchasers and representatives of export organizations are pointing to the serious lag behind the best analogues (and this is evident from the material included in the selection).

The article by VAZ officials contains convincing figures on the comparative efficiency of the conventional domestically produced machines, the same machines manufactured in accordance with general VAZ technical specifications and analogous imported machines. As can be seen, an orientation on the VAZ specifications made it possible for some plants to increase machine quality sharply, while at the same time reducing the number of breakdowns 3-14-fold. But even these improved figures remain substantially below those for equipment bought in 1970-1971.

/Eliminating the substantial lag in our tool-manufacturing industry constitutes a very important condition of efficient machine-tool operation./ Production of tools and production components for metalworking equipment lags substantially behind present-day requirements and the possibilities of technical progress with respect to technical level, qualitative scales of output and level of organization as well as behind the requirements of the machine-building industry.

Structure of US Machine-Tool Industry
(based upon 1977 data)

	number of enter- prises	number of workers, thous.	nominal net pro- duction	real- ized value	capital investment million dollars
Production of metal-cutting machines	909	37.6	1093	2879	80.7
Production of forging and pressing equipment	425	16.1	723	1134	24.6
Output of production components	7154	85.6	2791	3910	176.9
Tool production	1408	39.7	1583	2372	77.6
Total by category	9896	179.0	6190	10295	359.8

Modern-day machine building has seen the role of the tool and associated production components grow enormously. In advanced machine tools, particularly those with NPC,

and production lines, the machine, the tool and all associated production components are integrated. The productive efficiency of a machine tool will vary over a very wide range depending upon the tool and attachments with which it is equipped and upon their quality. The tool and associated components fairly frequently limit the efficiency of machine operation. As A. P. Kirilenko declared at the conference of machine-tool builders in March 1980, "the tool problem has become a particularly pressing one over the past few years."

While production of diamond tools has grown substantially, they are not yet of high enough quality, which remains below the world level. Hard-alloy tools, now employed most extensively in metalworking operations in the machine-building industry, are now manufactured here from billets which are substantially inferior in quality to foreign analogues. There is as yet virtually no production of the high-speed cutting tool coated with the nitride and other compounds of titanium which our industry has already tested.

/The organizational aspect plays an important role as well. Despite a multitude of decisions, we are still seeing no specialized production of ancillary production components, while the construction of new facilities is proceeding at an unwarrantedly slow pace./ These components are now being produced primarily by each machine-building plant "for itself," on something of the order of a subsistence economy. As stated in the article by D. I. Semenchenko, deputy director of the All-Union Scientific Institute for Tool Research, the result of this situation is that only one-third of our tools are being fabricated in specialized facilities. The experience of the American machine-tool industry is worthy of attention in this regard.

Characteristic here is the fact that enterprises of specialized branches manufacturing tools and equipment turn out almost 80-90 per cent of these products. The "coefficient of inclusion" [koeffitsient okhvata], as it is referred to in US statistics, has been 92 per cent in machine-tool production, 87 in forging and pressing machine production, 79 in the fabrication of ancillary production components and 89 per cent in tool production.

It is of particular importance to point out that with respect to nominal net production, the manufacture of ancillary production components exceeds by 2.2 times, and to value of realized production comprises 95 per cent of the production of the machine-tool manufacturing industry and of pressing and forging operations in machine building. In terms of volume of capital investment it exceeds these categories 1.7 times. With respect to nominal net production, tool manufacturing also exceeds machine-tool building and is almost equal to it in terms of volume of capital investment (96 per cent).

In the US, a large number of small enterprises are engaged in the production of tools and particularly of the components associated with them in the production process. The average number of workers involved in tool production here is 28, 12 in the manufacture of associated components (7154 enterprises). It should, it is true, be mentioned as well that small enterprises dominate the machine-tool manufacturing industry itself (41 the average number of personnel). There are two reasons for this. First, the predominance of medium- and small-scale production of machines, which in a number of instances are fabricated in accordance with specific customer requirements. Second, the existence of an extensive network of small enterprises manufacturing parts and functional components for these machines. It is particularly important to point

out that labor productivity in these small facilities, computed in terms of nominal net production per worker per year, is not only not lower, but even higher than in the machine-tool manufacturing industry itself: machine production - 29,100 dollars, forging and pressing equipment - 44,900 dollars, associated production components - 32,700 dollars and tool production - 39,900 dollars. These small plants are clearly quite efficient. It follows from what we have said that we need to create new capacities, accelerate the development of highly specialized tool-production operations and essentially reorganize a specialized industry for the production of associated production components.

As experience has shown, small, highly specialized plants in small towns may be extensively employed for this purpose. We might apparently find it worth considering as an advantageous transition to set up an intraminsterial, and possibly a regional, specialization in tool shops of machine-building plants, each concentrating on certain kinds of tools and equipment and oriented on the requirements of the ministry or region as a whole. This experience has been most efficiently utilized by the Ministry of Tractor and Agricultural Machine Building and Leningrad machine builders. It needs to be exploited extensively.

We should solve problems associated with development of a broad base of enterprises specializing in the production of functional machine-tool parts and units on the very same basis.

The need for substantial modification of proportions in and accelerated development of the tool-manufacturing industry and industry engaged in production of associated production components and an intensified drive for specialization, particularly functional specialization, in the machine-tool industry itself is clear enough. In our view, this is the course we should pursue in allocating capital investments over the course of the Eleventh Five-Year Plan.

The CPSU Central Committee, the USSR Council of Ministers and the 26th Party Congress have set the machine-tool industry some very important tasks. At the conference of machine-tool builders the Central Committee assigned the task of executing a revolutionary turn in the direction of improving the structural design of our equipment, raising its technical level and then on this basis of moving on a broad front with introduction into the machine-building industry of advanced technologies and highly efficient methods of production organization.

Pursuit of this course means a shift in the direction of intensive development of the branch. The Eleventh Five-Year Plan already calls for substantial reductions in the absolute number of machine-tools to be manufactured (at the expense of the outdated general-purpose models used as replacements in the subsistence operations in all branches of the economy) and significant improvement in their technical level and quality. Gosplan is proceeding on the basis of the need in this instance to increase the productivity of the new machines 1.5-fold over that of those they are replacing.

L. N. Snovskiy, chief of Gosplan USSR's machine-tool manufacturing department, points to the need to accelerate inventory replacement from the 2-2.5 per cent in the Tenth Five-Year Plan period to 4 per cent in the Eleventh Five-Year Plan. But with a 10-15 per cent cutback in production, how are we to double the rate of replacement of an enormous inventory like the one in our machine-building industry? Does that mean two-thirds of our output is going to have to go for replacement!? Will the remaining

third be enough for the accomplishment of all our other tasks? It clearly seems that we should outline an objective-oriented program of freeing up the numerous new machines from the "third machine-building industry" (the machine shops of nonmachine-building plants), particularly considering the fact that, as statistics demonstrate, the average age of the machines here is lower than that of machines in machine-building plants. There are no few highly complex problems involved here!

During the Eleventh and Twelfth Five-Year Plans we should set our course in the primary direction of increasing out production of machine tools with NPC, particularly of multi-operation working centers and of machine with NPC operating systems and built-in microcomputers. By way of implementation of the directives of the 26th Party Congress we are seeing the use of readjustable production equipment and components, to include working centers and unit machines with replaceable multisindle boxes. This will make production operations more flexible and mobile.

A highly progressive technical-organizational measure has been our work on the design and on organizing the production on an extensive cooperative basis of a unified series of drilling, milling and boring machines with NPC, which are being built on the basis of the modular-unit principle. Output of these machines will reach several thousand units by 1985, more than half of these of the "working center" type, which automatically changes tool and replaces billets. We must also achieve substantial increases in the scales of our manufacture of machines for finishing, to include superfinishing operations. It would at the same time be to advantage to make more extensive use of the simpler and less costly cutting and threading machines to perform simple operations rather than employing our general-purpose machines.

We need to increase our billet production capacities taking into account the requirement of the major machine-building centers, including those operating on an interdepartmental basis. Any anticipated growth in machine-tool manufacture, and hence in machine building overall, is inconceivable without a sharp and immediate reorientation of the electrical equipment, electronics and instrument-manufacturing industries toward the requirements of the machine-tool industry.

/Just as the machine-building industry must unconditionally take into account the needs of the machine-using branches by everywhere setting up "machine service" operations, helping with the installation and assimilation of the equipment it has manufactured and by providing guaranteed maintenance and repairs, so must the machine-tool industry as well organize a full-fledged machine-tool service operation./ Much has properly been said about this in the articles which have been published, very interestingly and instructively in the article by VAZ officials. They point with equal justification to the absence of the economic conditions for the functioning of a machine-tool service operation. This problem has been characterized in very clear-cut terms by V. P. Kabaidze, general director of the Ivanovskoye machine-tool manufacturing association. It is clear that Gosplan SSSR, Goskomtrud [State Committee of the USSR Council of Ministers on Labor and Wages] and Minfin [USSR Ministry of Finance] must finally resolve this problem.

There is one other difficult problem involving the mutual relationship between our machine-tool makers and "machine-tool users," a problem of very great national economic importance. This is the problem of the dimensional parameters of our machines and of the pieces to be worked on them. As practical experience has demonstrated,

we have a substantial excess of machine capacity parameters, primarily, of course, in our general-purpose machines. A. Ye. Prokopovich, deputy minister of the machine-tool and tool-manufacturing industry, acknowledged this in pointing out that "every enterprise is trying to buy itself a machine 'one size larger'." V. I. Aksenov, a representative of the Tekhnika association, has told how pieces the size of a fist are being worked on 24-ton machines. "Everybody's trying to get a machine that's a little bit bigger," says L. N. Snovskiy, chief of Gosplan SSSR's machine-tool department. If you take into account the fact that in our experience there are almost no instances in which one plant has asked another to work a large piece (when the neighbor might have large machines not operating at full load), the situation becomes even worse. And then since any rise in fixed capital cost is of no particular concern to our plants, there are no, or virtually no, economic obstacles to the acquisition of excess capacities, particularly considering the fact that increased capital expenditures for the purchase of heavier and larger-capacity equipment are included in production costs.

This situation obviously requires impartial study; we need to "put our fingers into these sores" and see how many cannons we have firing at sparrows, to consider how much unnecessary metal these "cannon" are consuming and to draw the appropriate conclusions. A necessary condition, of course, is to insure high quality in the production of small machine tools so as to make it advantageous to buy them.

The problem of excess capacities also finds expression in the load imposed upon our most advanced and expensive machines. As was reported in the course of the roundtable discussion, our machine tools with NPC are in use as many as 230-260 hours each month, that is, they are working a little more than one shift.

A rational solution of this group of problems would to a certain extent relieve the machine-tool industry of an unwarranted share of this load.

Mobilization of the as yet untapped potential of our machine-tool industry, consistent pursuit of an expedient technical and structural design policy and utilization of the great store of experience at the disposal of the cadres of specialists and workers in the machine-tool industry--all these things will create the necessary preconditions for accomplishment of the large-scale tasks which the 26th CPSU Congress has set the machine-building industry and its key branch--machine-tool manufacturing.

FOOTNOTES

1. PRAVDA, 12 March 1980.
2. That is, no "excess" reliability, a situation in which individual components have reliabilities exceeding those of the basic units of the machine.

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METALWORKING EQUIPMENT

CONTROL ORGANS FIND MANY PLAN VIOLATIONS, SUBTERFUGES, INEFFICIENCIES

Moscow PLANOVYE KHOZYAYSTVO in Russian No 11, Nov 81 (signed to press 6 Oct 81)
pp 12-22

[Article by First Deputy Chairman of the USSR People's Control Committee A. Shitov:
"Raising Plan Discipline Is a Requirement of the Times"]

[Text] The party pays special attention at all stages of building communism to raising the role of planning and the level of plan discipline and to heightening the significance of state national economic plans, which form the main tool for realizing the party's economic and social policy.

CPSU Central Committee General Secretary and USSR Supreme Soviet Presidium Chairman L. I. Brezhnev pointed out in the Accountability Report to the 26th CPSU Congress that the party has always viewed the plan as law, because its observance will provide for the coordinated working of the whole national economy.

In his speeches, L. I. Brezhnev has accurately defined the observance of plan discipline as development of the plan in good time--by the established deadline, the provisioning of good coordination and a balancing of the tasks for all indicators, economic elements and republics, the unconditional fulfillment of the tasks stipulated by the plan, the establishment of businesslike daily monitoring of progress in plan fulfillment, and strict treatment for violators of plan discipline. Thus, monitoring the progress of plan fulfillment is an integral component part of the plan for managing the economy.

In accordance with the USSR Constitution, the country is taking important steps to improve the activity of all control organs. Adoption of the Law on People's Control in the USSR and the CPSU Central Committee decree of 17 January 1980, "On Measures to Further Improve the Work of People's Control Organs and to Strengthen Party supervision of Them in Connection with Adoption of the Law on People's Control in the USSR," is of special significance. These aim the whole system of people's control at executing constant and all-embracing monitoring of the fulfillment of state plans for economic and social development and other plan tasks. The CPSU Central Committee points out that people's control organs are called upon to check systematically the fulfillment of plans for industrial and agricultural production and capital construction, a rise in labor productivity, and improvement of output quality.

Leninist principles for organizing control and for checking performance was further developed in the CPSU Central Committee decree, "On Further Improvement of Control

and Performance Checking in Light of the 26th CPSU Congress Decisions," which was adopted in August 1981. It emphasized especially that the lag of certain branches of industry, cases of failure of plan tasks, poor management, inflated reports and eyewash are to a great extent the result of a low level of performance discipline and of personal responsibility.

In carrying out the orders of the CPSU Central Committee and in accordance with the Law, the USSR Committee of People's Control and its local organs are focusing their attention on questions of monitoring the realization of state plans. In 1980 alone they checked on the fulfillment of goals at 35,600 enterprises and organizations of various branches of the national economy. Of the questions that the committee examined in the first half of 1981, about half touched on the execution of plan tasks and the observance of commitments for deliveries of output. Right now, when the party and the government have adopted important decisions about improvement of the economic mechanism, it is necessary to penetrate more deeply into production and the organization thereof and to deal more strictly with economic supervisors, not only in regard to total output of products but also fulfillment of the goals for all indicators specified by the plans.

People's control committees recently have been making checks increasingly frequently, basing them on a comprehensive economic analysis of production work and the quality of its planning. This enables facts and phenomena to be assessed more completely, existing reserves to be uncovered, and, in the final analysis, control to be exercised more objectively and effectively.

Successful fulfillment of the state plan depends greatly upon the thoroughness of its development and on an effective balancing of tasks and the level of their strenuousness. During the checks, people's control organs uncover many cases where individual economic supervisors strive, when developing plans, to underestimate the existing production potential and to obtain more material resources and capital investment.

The Tajik SSR People's Control Committee discovered gross violations of standard planning practices in the agricultural-production association Tadzhikplodovinprom [Tajik Fruit and Viniculture Production Association]. From year to year the association approved understated plans for production and output realization, which were easily overfulfilled, and workers were given undeserved bonuses. The production plan for sunflower seed, for instance, was understated by 4,500 tons in 1979 and by 4,000 tons in 1980, and the plan for sales by 1.2 and 1.0 million rubles, respectively. The association established for some subordinate enterprises plan indicators that were lower than called for in their technical, industrial and financial plans. The tasks were carried out with great delay. Counterplans for working collectives were not taken into account. The republic's people's control committee presented the papers from the check to the republic's gosplan, which increased the association's plans for sales and profit and also for state purchases of sunflower seed and grapes and the output of wine-making materials.

In Leningrad, people's controllers found at the Combine for Fine and Industrial-Wool Cloth imeni F. Tel'man serious deficiencies and oversights in developing a draft plan for the 11th Five-Year Plan. Textile production capacity that had been put into operation in 1979 had not been considered during planning, and the rates of growth for production volume and labor productivity specified were substantially lower than what had been achieved during the 10th Five-Year Plan. As a

consequence, the combine's plan for producing output during the current five-year plan was increased considerably. In all, during compilation of the 1981 plan, 39 of the city's enterprises adopted new, more strenuous plans which made better use of production reserves, after a check by people's control organs.

Substantial reserves were discovered by people's controllers of a number of Union republics and Russian Federation oblasts at the stage of plan formulation.

In considering that the effectiveness of the economy depends upon the acceleration of scientific and technical progress, primarily in machinebuilding, the committee and its local organs began to pay more attention to checks on the fulfillment of plans and tasks for developing and introducing machinery and progressive technology. Last year, for example, the Union committee in this field checked the work of more than 100 large associations, enterprises and scientific-research and design-development organizations. Most of them had worked earnestly to solve important national-economic tasks. At the same time, no few omissions and unused reserves were discovered during the checks. For example, it was established that seven design-development and technological institutes, six experimental plants of the VPO Soyuzavtopromoborudovaniye [All-Union Association for the Production of Automotive Equipment] of Minavtoprom [Ministry of Automotive Industry] had carried out the plan in terms of costs but had been poor at solving the main task--the execution of measures for strengthening the scientific-research and experimental design-development base, for intensifying the role of the industry's science and its link with production, and for creating and introducing means for mechanization and automation and progressive industrial processes that support labor productivity growth. According to the ministry's evaluation, the introduction of these institute's developments during the 10th Five-Year Plan had resulted in only 10,000 people being provisionally released at production facilities in which the institutes are specialized. This is equivalent to raising the branch's labor productivity by 1 percent, while its growth for Minavtoprom as a whole was 34.5 percent. What is more, these data for the association are not accurate, since it was found during the check that, according to Ul'yanovsk Scientific-Research and Industrial-Design Institute computations, more than 13,000 people had been released in 1976-1979 by the introduction of its developments, while according to the plants' data only 975 had been released during all the years of the five-year plan. More than 51 percent of the workers employed at the enterprises at which the institutes' developments had been introduced were doing manual labor. In the preceding 2 years, only 267 of the 506 recommendations of the institutes that were introduced at the ministry's plants caused release of worker personnel, and 239 did not lead at all to a reduction in their numbers.

The work of Minavtoprom institutes has not been concentrated on solving major industry problems of the integrated reequipping of enterprises with machinery. As a rule, the annual project plans call for work that will solve local problems but will not greatly increase labor productivity in the branch. The plans of the L'vov Experimental Design-Development Technological Institute, for example, do not include one project that will solve in integrated fashion problems of mechanizing the wrapping and preserving of articles in washing-and-drying production work. Meanwhile, 85 and 70 percent, respectively, of the work of these production facilities is being performed manually. The proper attention has not been devoted to introducing means for mechanization and automation into production. Last year, for example, only 81 percent of the developments approved by the association's plan had been assimilated.

The ministry and the VPO Soyuzavtopromoborudovaniye took definite steps aimed at raising the effectiveness of the institutes' work in accordance with the results of the check. Programs were prepared for reequipping the industry with machinery for industrial conversions during the 11th Five-Year Plan. Project plans for 1981 were reviewed, ineffective portions of them were excluded, and the remaining projects were enlarged. A schedule for making an integrated evaluation of the institutes' scientific and technical activity was approved by an association order. And a number of other steps were taken.

All this enabled the institutes to complete 32 special projects under a plan for 29 in the first half of 1981 and to overfulfill the plan for introducing developments. During the first half of the year, 55 operations were mastered under a plan for 37, and an economic benefit of 3.8 million rubles was obtained versus a planned 1.8 million rubles.

There are deficiencies in the matter of meeting plans and goals for developing and introducing equipment at the scientific-research institutes of other ministries. Because of this, the technical level and quality of certain machinery and equipment that are being produced, as well as their reliability, longevity and productivity, still remain at a low level. A serious lag has occurred, for example, in the creation and production of compressors and cooling units, which require up to 10 percent of the electric power generated in the country. Many compressors produced by Minkhimmash [Ministry of Chemical and Petroleum Machine Building] are manufactured under obsolete designs and require 5-7 percent more electricity than modern units. A similar situation was found also in the development and production of drilling equipment. A large number of rigs often fall below the requirements of the state standards in regard to rotating-speed range, maximum forward force, noise and vibration levels and torque. Because of this, the speed of core drilling in our country is 1.5-fold to 1.7-fold lower than in some other countries.

Minkhimmash also caused a reduction in the pace of updating geological-exploration equipment. Last year the share of drill rigs whose operation had started more than 10 years ago was double the 1976 figure. A selective check established that 23 types of new articles that had been developed in the preceding five-year plan still have not been produced serially. According to USSR Ministry of Geology data, the country's geological exploration enterprises would have saved millions of rubles during drilling if just eight of them had been introduced on time.

Deficiencies in the work to raise the technical level of machinery and equipment and to assimilate new technology were discovered also at enterprises and scientific and design-development organizations of Minenergo [Ministry of Power and Electrification], Minzhivmash [Ministry of Machine Building for Animal Husbandry and Fodder Production] and Minstroydormash [Ministry of Construction, Road and Municipal Machinebuilding].

Ministries, agencies and enterprises subordinate to them often pass off obsolete equipment as new, and the existing system of certification of industrial output does not reflect completely its quality and technical level. The causes here are, primarily, a lack of scientific and technical information and weak control on the part of the USSR State Committee for Science and Technology and USSR Gosstandart [State Committee for Standards] of the technical level of new types of equipment.

A no-less important question that people's control organs are paying attention to during their checks is the use of highly productive equipment. Industry now has

about 60,000 machine tools with numerical program control. Practice shows that their introduction is one of the effective ways for reducing the shortage of labor resources. With correct operation they work with 3-4 times as much productivity as general-purpose machine tools that are in a high machining-precision class.

However, actually, this is not occurring everywhere. A check of the use of 8,300 machine tools with numerical program control at Mintyazhmarsh [Ministry of Heavy and Transport Machine Building], Minelektrotekhprom [Ministry of Electrical Equipment Industry] and Minstankoprom [Ministry of Machine Tool and Tool Building Industry] enterprises indicated that, at the time of the check, about 3,000 of them were not in operation at all. Machine tools that were operating were under a load for less than 8 hours per day, versus 9.5 hours for general-purpose machine tools. The production association Elektrovozostroitel' [Electric-Locomotive Building Association] of Minelektrotekhprom did not for a long time operate four multiple-function machine tools with automatic tool change that cost a total of 800,000 rubles. Ten lathes with numerical program control were not being used for a fourth year at the Starokramatorsk Machinebuilding Plant imeni Ordzhonikidze of Mintyazhmarsh. And at the Sasov Automatic Assembly-Line Plant of Minstankoprom, 18 machine tools, 14 of which have had to be written off, had been brought to an unfit condition for various reasons. The state had thereby been damaged in the amount of almost 900,000 rubles. The workers who were guilty of a wasteful attitude toward the new equipment were brought to strict accountability.

The Union Committee of People's Control checked the reasons that 63 automatic and semiautomatic production lines were shown in state reporting as surplus this year at 40 enterprises of 13 ministries. It was explained that the enterprises, associations and ministries, after ordering the lines, had not done the work of assigning them rationally on time, had not prepared production space for their operation, and had not phased the delivery of the lines with the construction of the industrial facilities. Thus, for example, the Donetsk Excavator Plant of VPO Soyuzekskavator [All-Union Excavator Production Association] of Minsel'khozmash [Ministry of Tractor and Agricultural Machine Building] in its reporting on 1 January 1981 showed 2 automatic production lines, which cost a total of 2,984,000 rubles and which had been ordered in 1975 for a foundry that was being built, as surplus equipment. The lines arrived at the plant during 1978-1980. However, it turned out that there was no place to put them, since construction of the building had been stretched out.

The main cause of unsatisfactory use of progressive equipment is that various association and enterprise supervisors do not pay due attention to establishing suitable conditions for the more economical operation of highly productive equipment, do not concern themselves with training skilled workers to operate them, and order equipment without the required analysis and substantiation, as a result of which some equipment is not used.

During the check, specific decisions were made on assignments for 27 lines, and, for the remainder, measures for making desirable use of them were set, intending that they would be introduced into operation in 1981-1982. The corresponding changes have also been made in state reporting. The officials guilty of not taking steps to make timely use of the automatic and semiautomatic lines, of preparing orders for unneeded equipment and of misrepresentation in state reporting were brought to disciplinary and pecuniary account by people's control organs.

In order to fulfill our plans successfully and to raise the pace of growth in production, the party has established the task of reequipping the national economy with machinery and of supplying it with the most modern machines and equipment. Because of this, the effectiveness of use of the resources allocated for technical reequipping and for rebuilding enterprises is acquiring special importance.

Minkhimash, for example, expended 680 million rubles for these purposes during the 10th Five-Year Plan, and, in so doing, the amounts planned for assimilation were fulfilled 103 percent. It became possible to obtain a 27-percent growth in production with them. But this can scarcely be considered positive, since the share of resources spent on reequipping was about 40 percent of the total amount of capital investment. As a result, the effectiveness of technical reequipping in the industry proved to be 20 percent lower than the new construction. In brief, the reequipping proved to be much more expensive.

Among the basic causes of this situation are serious deficiencies in the ministries' work in planning and financing capital construction and in reequipping production facilities. Technical and economic tasks often are not defined for enterprises when capital investment is being allocated, and tasks for labor productivity growth, release of workers, and conversion to the production of new types of output are not being established. Financing operations frequently are accomplished where there is no preliminary design and budget-estimating and financing papers. Enterprises are not being reequipped in integrated fashion.

An important factor that affects the fulfillment of plan tasks is their stability. Unjustified revisions of plans lead to a weakening of state and plan discipline and artificial improvement of the enterprises' operating indicators for various periods and they permit workers to be paid undeserved bonuses.

The party and the government have repeatedly prohibited unsubstantiated revisions of enterprise and association plans by ministries and agencies during the year, intending that revisions can be made in exceptional cases and only for reasons that do not depend upon the production and economic activity of the enterprises and associations.

Unfortunately, the practice of revising plans during the year continues, and it is fairly widespread. In the last year alone the annual plan for output sales in industry was changed in 57 percent of the associations and enterprises, almost one-third of them being reduced in December. In some ministries the plan tasks for a majority of the enterprises and associations have been changed.

Checks have disclosed numerous cases of simultaneous change of quarterly and annual plans. In some cases the enterprises, in striving at times to create the appearance of well-being without adequate justification, transfer tasks from the first month of the quarter to the last and then strive to get from the superior organization a reduction in the plan for the quarter as a whole, and they reduce the program for the last month. All this enables monthly plans to be met, while tasks for the quarter, and sometimes even for the whole year, are disrupted.

For instance, in 1980 VPO Soyuzrezinotekhnika [Association for the Production of Industrial-Rubber Products] of USSR Minneftekhimprom [Ministry of Petroleum Refining and Petrochemical Industry], for example, introduced more than 100 changes in the annual and quarterly plans for sales of output for 25 enterprises, and in the

first quarter of this year it made 34 changes for 10 enterprises. Labor productivity tasks are revised especially frequently. Changes in this indicator average 8 per year per enterprise. In many cases the plans are revised without adequate economic justification and, in essence, the purpose is to adjust them to the fulfillment that is expected. The association, instead of analyzing deeply the causes of the lag that has been permitted, often satisfies enterprise requests for plan reductions under the pretext of "refinement of the quarterly breakdown" or "production necessity." The supervisors of these enterprises often obtain bonuses without actually carrying out the established tasks.

Unsubstantiated arbitrary revisions lead in many cases to the overfulfillment of plans that have been reduced. The Kazan' Industrial-Rubber Products Plant, for example, requested the above-mentioned association to reduce the 1980 and fourth quarter plans for sales by 1.7 million rubles. The VPO reduced it by 2 million rubles, after which the revised annual plan was overfulfilled by 1.4 million rubles. The labor productivity tasks for 3 months were understated without adequate foundation. This permitted the plant to report fulfillment of the reduced plans and to pay the plant's administrative staff 121,000 rubles in bonuses.

Throughout Minstankoprom, 2.2 million rubles in bonuses were paid out in 1 year because of unjustifiable plan revisions. And this at a time when there was a shortfall of more than 180 million rubles' worth of output deliveries to the state from the industry's enterprises.

A serious deficiency also is the fact that ministries and associations often, in cases of reductions in plan tasks, do not make the necessary changes in the economic indicators, including the wage-fund, profit, personnel-manning and other indicators. Meanwhile, when the fund-forming indicators are reduced during the year, the amount planned for the incentive fund should be reduced simultaneously, in accordance with the established standards.

With growth in the scale of specialization of production, with conversion to direct contractual commitments, and with complication of the economy's structure, the final national-economic results will depend increasingly upon the precision of the work of intermediate links and the system of intraindustry and interindustry ties. More than 2.3 million contracts for the delivery of output that cost more than 130 billion rubles are now being concluded annually in industry between customers and suppliers, according to USSR Gosnab data alone. Nonfulfillment of plans for the delivery of output in accordance with the contracts that have been concluded and orders that have been accepted for execution inflicts substantial economic harm on the national economy and introduces disorganizing elements into our planned economy.

The results of a check that is being made by people's control organs indicate that many economic supervisors underrate the importance of the stability of contracts and the strengthening of plan and contract discipline. Indicative of this is the fact that in 1980, as in the first half of 1981, about half of industry's associations and enterprises underfulfilled contract commitments, falling short in deliveries of output to customers by many billions of rubles, while three-fourths of the enterprises of USSR Minchermet [Ministry of Ferrous Metallurgy], Minkhimprom, Minctrotckhprom, Minstankoprom and a number of others did not completely fulfill contract commitments and 81-85 percent of those in Minlegpishchemash [Ministry of Machine Building for Light and Food Industry and Household Appliances], Minkhimmash and Mintyazhmash failed to do so.

Many violations of contractual commitments are committed in Minsel'khozmash. In 1979 the ministry's enterprises fell short in deliveries by 345 million rubles' worth of output under 9,000 contracts. In 1980 the shortfall in deliveries of output under contracts exceeded 300 million rubles.

Even where there are difficulties with raw and other materials and also with transport, numerous violations of contractual agreements could not occur if enterprises and associations would pay greater attention to organizing production and to timely delivery of output through intraindustry subcontracting. And the main thing, perhaps, is the imposition of order in the accounting for and monitoring of the fulfillment of the plan for deliveries.

Often, in striving to carry out the plan for sales in terms of value, enterprises manufacture and send to customers the less labor-intensive, more expensive articles. In so doing, products of limited demand are produced and shipped instead of articles that are severely needed in substantial amounts.

In 1980, for example, Minstankoprom reduced the plan for commodity output and sales thereof for the Kolomna Machine-Toolbuilding Production Association to one-third. When this did not help, the association, for the purpose of fulfilling the plan, produced simple presses worth 153,000 rubles instead of three complicated labor-intensive presses that cost 2.5 million rubles, and overfulfilled 3.5-fold the task for producing such output.

The procedure for concluding contracts is often violated when the entire list of products called for by state plans for economic and social development is not included completely in the contract. Supplying enterprises in some cases do not indicate in the contracts the precise dates of shipment and, therefore, postpone a major portion of output deliveries until the end of the year. Despite the established procedure, dates for delivering output are changed without coordination of the customer and the organization that issues the orders.

Contract commitments are disrupted fairly often as a result of the illegal sale by enterprises of articles above the allocated funds and the release thereof to outside organizations. In 1980 alone, Yaroslavrezinotekhnika [Yaroslavl' Industrial-Rubber Articles Production Association] of USSR Minneftekhimprom released 488,000 rubles' worth of various articles to other customers above the allocations, through undershipments to various recipients. For example, there was a shortfall of 699,000 standard-unit equivalent drive belts under contracts, but 248,000 units of them were shipped above orders that had been issued. With regard to ventilator belts, while there was a nonfulfillment of delivery commitments for 140,000 items, 178,000 items were sold above the contracts. Moreover, the association has in recent years been releasing output on a large scale to various enterprises and organizations without orders in exchange for building materials and articles, furniture, textiles, paper, motor-vehicle spare parts, equipment, services and so on. While contracts for delivery were underfulfilled in 1980 and the first 3 months of 1981, the association squandered 424,000 rubles' worth of output that was sent to various enterprises and organizations that were located in more than 100 of the country's cities. Thus, a tractor was acquired for drive belts from the Mayskiy Division of Agricultural Equipment of Kirovskaya Oblast, and two trailers were obtained from the Orsk Tractor-Trailer Plant for industrial-rubber sheeting and ventilator belting. In exchange for ventilator belting, the Yaroslavl' furniture combine Krasnyy Oktyabr' released to the association 50 chairs and 13 pier mirrors. For releasing

3,500 belts without allocations, the association obtained 258 tons of cement from the Gornozavodsk and Mikhaylovka Cement Plants, 100 m³ of lumber from the Cherepovetsles Association, and 240,000 bricks from the Nora Ceramic Wall-Materials Plant. Claims should be presented here not only against the Yaroslavl' Rezinotekhnika Association but also against those who, to the detriment of the fulfillment of their commitments for deliveries, went along with that organization and squandered strictly allocated materials.

Checks at Minstankoprom, Minzhivmash and Minenergomash [Ministry of Power Machine Building] discovered that important deficiencies in the fulfillment of contractual obligations were explained to a great extent by the fact that the ministries are not properly monitoring the process of shipments of output made by their subordinate enterprises under contracts and are not exacting toward enterprise supervisors who fail to meet deliveries contracted for. Moreover, unsubstantiated plan revisions that are made with ministry authorization almost always lead to violations of contract discipline, since the dates for fulfilling the contracts and obligations and for the delivery of outfitting articles more often than not are not revised.

Soyuzglavbyts [All-Union Main Administration for the Marketing of Materials and Equipment] often issue to enterprises orders that have not been balanced with cost and in-kind indicators. In most cases the amounts of the shipments made under the contracts exceed the task for sales of output. This creates a situation under which the enterprises fulfill plans for gross indicators in monetary terms, yet, in essence, the nonfulfillment of tasks for delivering output for the prescribed products mix is inevitable. Important deficiencies in planning were discovered at many plants of VPO Soyuztransformator [Association for the Production of Transformers and High-Voltage Devices] of Minelektrotekhkhrom. The volume of sales of output for 1981 for Uralelektrotyazhkhrom [Urals Production Association for Heavy Electrical Machinebuilding] alone was set at 15 million rubles less than the amount required for the realization of shipments under orders being fulfilled and contracts that had been concluded, an amount that makes up 10 percent of the annual plan.

A number of enterprises, with a view to artificially increasing the percent of fulfillment of the plan for deliveries of output under contracts, include in their reports articles that have not been finished by production but have been manufactured and are left, with the customer's concurrence, for responsible custody at the enterprise that produces the output. There are cases where output that is sent to one recipient above the amount specified for a given period in the contract or in an order issued for execution is taken into consideration in covering for the underdelivery of the output to another recipient, or when the output shipped of some items is given consideration in covering for the underdelivery of output of other items.

An especially gross violation of contract discipline is the above-norm use of output for in-house needs to the detriment of the fulfillment of contractual obligations. Sometimes deliveries under contracts are disrupted to satisfy agency interests when enterprises overfulfill plans for intraindustry deliveries and, at the same time, fail to deliver output to enterprises of other branches of industry, violating the rational economic ties that have taken shape.

It should be noted that people's control organs are taking all measures to suppress plan-discipline violations. During the first half of 1981 alone the Committee of People's Control and its local organs made checks at almost 15,000 enterprises and

organizations on progress in the fulfillment of plans for economic and social development and of plan tasks, and of commitments for deliveries of output for production-equipment purposes, and it punished about 25,000 economic supervisors for serious deficiencies in their work.

People's control organs recently have started to pay more attention to monitoring the authenticity of the data of reports. The USSR Committee on People's Control alone made checks on these questions in 26 Union and Union-republic ministries. Local people's control organs conducted checks at more than 30,000 enterprises and organizations. It was found that the intra-agency control established at many ministries is weak. Reports that were inflated or distorted in some degree were found by people's control organs at almost one-third of the enterprises checked.

The infamous practice of including in reports unfinished production of output profitably prepared documents has been fairly widespread at Mintyazhmash enterprises and associations. Such cases were found repeatedly at the Voroshilovgrad Machinebuilding Plant imeni Parkhomenko, the Novokramatorsk Machinebuilding Plant imeni Lenin and the Buzuluksk Heavy Machinebuilding Plant. In one year the Elektrostal'tyazhmash Association included in the reports each month unfinished production of equipment, through which commodity output was overstated by 8 million rubles' worth. For these purposes, 208 certificates on supposedly finished articles were made up.

Reports on output that were inflated or distorted in the sum of 10.5 million rubles were found at 19 USSR Minpishcheprom enterprises. At many USSR Minenergo construction projects the actual volume of freight hauling by automotive transport in 1980 was overstated by 40-80 percent. On the Kemerovo Railroad the number of cars loaded with coal was overstated almost 2-fold. Certain economic managers try through inflated reports to cover up shortcomings in their work, to embellish the indicators, to delude superior organs, and to be rated undeservedly among the advanced entities. Chief of Soyuzekskavator Association of Minstroydormash Svidnitskiy did not react for a long time to numerous letters from customers of Donetsk Excavator Plant output, who had already paid the price of the excavators but had not received them. A check that was conducted established that the Donetsk Excavator Plant had inflated the report for the year by 101 excavators in the amount of 1.6 million rubles. Cases of report distortion were uncovered at a number of USSR Goskomsel'khoztekhnika [State Committee for the Supply of Production Equipment to Agriculture], Minsel'mash, Minlegpishchemash, and Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] enterprises.

Many distortions are committed in reporting on the fulfillment of tasks for introducing production capacity into operation. At the Magnitogorsk Metal-Structure Plant of USSR Minmontazhspetsstroy, for example, capacity for producing 5,600 tons of lightweight metal structure was accepted for operation in 1980. A check conducted 3 months after acceptance indicated that 375 units of equipment still had not been installed and output still had not been produced. After the check, the ministry countermanded the certificate of acceptance and scheduled an actual date for introduction of the new capacity at the above-mentioned enterprise.

People's control committees are dealing strictly with supervisors who are guilty of such violations. In 1980 alone the committees called 27,000 officials to account for inflated or distorted reports and sent the papers on the checks to the prosecuting organs.

One of the most important principles of the party's strategy in the area of economics, the core of its economic policy as defined by the 26th CPSU Congress, is an economical attitude toward the people's property, skill in making complete and expedient use of everything that the national economy places at our disposal. The party sees the effective use of all resources as one of the paths to intensifying production, an important and effective method for improving the balance of our plans.

It cannot be considered normal that some ministries and many associations, enterprises and organizations work uneconomically, permit large losses, and expend on production more resources than are required and specified by the norms. Great harm is inflicted on the state by nonproductive losses of raw and other materials, and also losses of valuable production waste.

In July 1981 the party's Central Committee and the USSR Council of Ministers adopted the decree, "On Intensifying the Work to Save and Make Rational Use of Raw Materials, Fuel, Power and other Material Resources," which specified a concrete program of actions for the more economical and assiduous expenditure of resources. It assigns an important place to meeting the national economy's requirements for fuel and power resources.

Our country is one of the few developed countries that is completely satisfying its fuel requirements from its own sources. Nevertheless, in recent years the national economy has experienced certain difficulties in providing fuel and electricity, primarily during the winter. This occurs because, on the one hand, our economy's demand for them is rising rapidly, and, on the other, costs for extracting raw materials for energy are being increased sharply because of the depletion of old fields and the difficulty of access to the new ones. Therefore, the drive to save all types of fuel and electricity is becoming especially important.

A check of the state of affairs in the saving of fuel and electricity that was made by people's control organs at almost 160,000 enterprises, kolkhozes, sovkhozes and organizations disclosed serious deficiencies, and in some cases a direct undervaluing of this important state matter.

On the Transcaucasus Railroad, for example, most enterprises were not given concrete tasks for reducing the consumption of electricity, coal, mazut and heat. A third of the electric locomotives were operating with defective recuperation equipment, as a result of which more than 5 million kw-hr of electricity were not returned to the network. Enterprises unjustifiably overstated the norms and ceilings on the consumption of electricity for operating needs. Many boilerhouses lacked schemes for heat regimes and instruments to record the consumption of water and steam, and a daily accounting for fuel consumption was not being made. Moreover, disorder in recording the consumption of energy resources was found in the Ministry of Railways itself. According to the Main Administration of Locomotive Affairs, for example, the Transcaucasus Railroad reported an overconsumption of 2.3 million kw-hr of electricity over the norms for train traction, but, according to the data of the Main Administration for Electrification and the Power-Engineering Activity, it had, on the contrary, a saving of 1.9 million kw-hr of electricity.

The measures taken have enabled substantial results to be achieved in a short time. The return of electricity through recuperation exceeded 27.6 million kw-hr during the first half of 1981, and a saving on train traction of 250,000 kw-hr of electricity was obtained, while in 1980 there was an overexpenditure of 8 million kw-hr.

Such results confirm that important advances can be made in saving raw and other materials if the business is undertaken properly.

Another pointed question is that of providing the national economy with rolled ferrous metals, which are not always consumed thriftily. Machinebuilding enterprises alone, mainly because of delays in the production of rolled metal of improved quality, of economical section and of substitutes, overexpend 200,000 tons of ferrous metals annually. Moreover, checks by people's control organs are finding numerous cases of overconsumption and losses of metal because of mismanagement, the concealment thereof from reporting, and the use of metal for purposes for which it was not intended. For example, a check on the authenticity of the results of an inventory of material resources that was conducted at the start of 1981 at 15,000 enterprises and organizations indicated that almost half of them had concealed from reporting more than 100,000 tons of ferrous metals and pipe and many other materials. In hiding scarce materials, the supervisors of some enterprises are creating surpluses that are unaccounted for, which are then released to the black market at their discretion, or they exchange them for other materials, that is, they actually are squandered.

The channels through which metal, fuel, heat and electricity are being lost are known. However, work on shutting the losses off and on uncovering reserves for savings still is not being conducted adequately. Economic supervisors have often been spending all their effort not on reducing nonproductive losses of raw and other materials and electricity but on obtaining overstated ceilings for themselves for the consumption thereof. When such cases are found, of course, the guilty get the most serious punishment. The USSR People's Control Committee is orienting its organs to deep and comprehensive study of this question and of the local state of affairs. Special attention is paid, in so doing, to raising the activeness and scale of and publicity about people's control, imparting to it a responsive and systematic nature.

The CPSU Central Committee decree on questions of monitoring and checking performance planned a wide and specific program of measures for further improving such operations. Its realization requires persistent, strenuous work by party, soviet and economic organs and people's control organs, with a view to showing in greater measure the basic political orientation of control--an embodiment of the party's general policy.

The party teaches that the whole multimillion-member army of people's controllers should be included more actively in the overall drive to raise the level of economic work and to fulfill plan tasks. L. I. Brezhnev emphasized at the 26th congress of our party that not one violation, not one case of misuse, wastefulness or lack of discipline should escape the proprietary glance of the people's controllers. To act more energetically, to act more aggressively--this is what the CPSU Central Committee is aiming them at.

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